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NEWSPAPER

Looks At a First User

Packet-Switched Net Inaugurates Service

By Ronald A. Frank
Of the CW Staff

BETHESDA, Md. – Scientific Time Sharing Corp. (STSC) has become the first user of a packet-switched common carrier, using facilities provided by Telenet Communications Corp.

Telenet has inaugurated service in seven cities and STSC is utilizing the packet-switched lines to serve its offices with its APL Plus service.

The initial Telenet network includes 56 kbit/sec Dataphone Digital Service (DDS) links from AT&T between New York, Washington, Chicago and Boston; AT&T 19.2 kbit/sec analog private lines to San Francisco and Los Angeles; and a private line link from the Data Transmission Co. between Chicago and Dallas.

The service is costing STSC about $2.28/hour based on a separate fee for connect hours and packets of data transmitted, according to John Myrna, communications manager for the time-sharing firm.

In order to interface to the Telenet system, STSC installed an IBM 3704 front end to its dual 370/155s. The 3704 is equipped with Telenet-supplied software that effectively makes the network transparent to the CPUs, Myrna said.

Instead of operating with a packet-switched network, the mainframes think there is a Memorex 1270 communications controller on the line, he explained. The net effect of this interfacing is that the various types of STSC terminals can continue to access the APL Plus service with minimal changes in access procedures.

To connect the STSC mainframes here to the Telenet network, a local Bell channel was established to the Telenet terminal office in Washington. On the remote end, each STSC terminal gets on the network by using public dial-up access ports available at Telenet central offices on a reserved basis.

A dial-up call gets the terminal operator into the dial port. Code characters are then entered to tell the network the desired speed, the font being used on the terminal and the type of terminal that is signing on.

A command is next entered to connect to one of the 155s, and a message is returned from the system asking for the first line of information.

Waiting for Stability

"While we are pleased with the way Telenet has operated to date, we will not shift substantial amounts of our network usage to Telenet until the end of the year, when we have confidence the network is

(Continued on Page 5)

Nasis Finds for Second Year

States Give DP Safety 'Lip Service'

By Nancy French
Of the CW Staff

LEXINGTON, Ky. – Privacy and security concerns are receiving "a great deal of lip service, but very little concrete action" at the state level, the National Association of State Information Systems (Nasis) has reported for the second year in a row.

In last year's report, Nasis pointed out most states were not auditing established security systems or even installing security plans for their computerized information systems. The association called these failures "potential catastrophes of great dimensions."

This year's findings, published in Nasis' fifth annual report and survey of information systems in the 50 state governments, "do nothing to lessen that dire foreboding," the report said.

The document, which covers everything from personnel and training to the status of system consolidation efforts, noted that only 16 states implemented any physical security plan at all and only seven states audited security plans in operation in calendar year 1974.

Twenty-one states rely on identification badges for physical security and 13 rely on entrance guards.

As for data security, only 12 states implemented data security measures in their centers. Of those, only six audit them.

In the area of confidentiality and privacy, the report said only one state privacy law was signed into law, one was awaiting a governor's signature and three had failed in 1974.

Some 52 privacy bills were introduced in 25 states. Eighteen states held committee hearings in the first house, with action moving to the second house in only one state.

For the second year, Nasis collected data on systems transfer projects and the results were encouraging, an association spokesman said.

While most transfers over the years have not gone beyond the systems design level because of hardware incompatibility, this year Nasis reported 22 transfers completed up to and including the level of program code.

North Carolina completed four program transfers in 1974 with three more in progress. Its environmental studies programs were transferred from New York, Kentucky, Arizona and California, the report noted.

North Carolina said it saved an estimated $10,000/mo for six months for one project alone. Since 1972, North Carolina, one of the most active states in sharing, has reported transferring about 16 complete programs.

Air quality programs developed in Connecticut were successfully transferred to Massachusetts, and Connecticut's deer management program was transferred to New Jersey, Nasis said.

Mississippi transferred several financial programs to North Carolina and Georgia, and Florida was in the midst of transferring parts of a legislative bill status program from Oklahoma to enhance the programming transferred from South Carolina last year.

Other findings indicated states are acquiring more savvy in buying and managing computer resources.

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NCR Control Software Feature Backs Cobol for On-Line Tasks

By Don Leavitt
Of the CW Staff

DAYTON, Ohio – Development of on-line programs is expected to be a lot easier for small-scale NCR Century users with operating software now available from the vendor.

In addition to new versions of the B3 and B4 multiprogramming executives and upgrades of language compilers, the control software – Release 8D by NCR's count – includes a subsystem called the Queue Executive Interface (QXI).

The interface works with the B2 dual-purpose executive that supports concurrent running of a real-time program and a sequential stream of batch programs on 32K or larger Centuries. With QXI, users can write on-line programs in Cobol and are no longer limited to working in an assembler-level version of NCR's Neat/3 language.

QXI is "built around B2 and a terminal's on-line communications driver," an NCR source said, adding that the purpose of the interface is to open the capabilities of on-line applications to users with limited knowledge of on-line techniques.

For larger users capable of running with the B4 multiprogramming executive, NCR has added printer spooling to magnetic tape, remote job entry with interleaving capability, data compaction on spooled printer files and improved system message displays.

B4 users continue to have facilities for print spooling to disk and the data compaction can be utilized – at user option – with either form of file. The spooling to tape allows off-line printing on smaller systems or printing on the originating CPU whenever the printer is free.

The B4 executive is designed for use with Century 251 and 300 CPUs, the largest in the series.

Improvements in the B3 executive include card input spooling, single job

(Continued on Page 5)

Supplies, Security Remain DP Center Concerns

• What Price Paper?

The paper cost explosion broke late last year, and prices have fallen or remained steady since then, according to one of the government's biggest paper buyers.

Some prices have dropped 40% since October, Joseph Hantman, director of office supplies and paper products for the General Services Administration, said. Hantman's agency spent about $165 million on federal paper procurement last year.

Interviews with DP managers across the nation tended to support Hantman; they agreed there is now a "buyer's market" for paper supplies, with sharp price jumps at least temporarily at an end and all talk of shortage gone.

While some users said they felt prices had stayed at their 1974 peak, others reported varying decreases. One DPer simply said he paid more for punched cards almost every month last year, but there hasn't been an increase so far in 1975.

Users were almost unanimous in agreeing that "the

(Continued on Page 4)

• What Price Security?

By Patrick Ward
Of the CW Staff

POUGHKEEPSIE, N.Y. – Bringing "risk within tolerable limits at the lowest costs" should be the aim of every user selecting security measures to protect his data center.

This means choosing security measures on the basis of their benefit/cost ratio, according to Robert H. Courtney Jr., a computer security specialist with IBM.

Each security measure's potential benefits must be quantified for comparison with its costs, he explained in a report prepared for the National Bureau of Standards (NBS).

Entitled "Security Risk Assessment in Electronic Data Processing," the report contains a description of a rational, systematic approach for analyzing security risks quantitatively. The methodology can be us[illegible] [illegible]sess-ing the risks of a particular organizatic[illegible]

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NBS Updates Federal Cobol Standard

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Once again the biggest user of them all has carried standardization of Cobol farther than the American National Standards Institute (Ansi) has.

The U.S. Government, through the National Bureau of Standards (NBS), has approved a revised Federal Information Processing Standard (Fips) requiring all Cobol compilers coming into the federal inventory to comply with Ansi's 1974 Cobol specifications.

Beyond that, the providers must identify the level of implementation their products meet out of four levels carefully defined by NBS.

In 1972, NBS set up a Fips calling for Cobol to be the standard language used – with minor exceptions – for business-oriented DP work within the Federal Government. At that time, compilers were required to meet Ansi's 1968 Cobol specifications, and suppliers had to state capabilities in terms of a set of implementation levels as NBS then defined them.

Ansi Modules \ NBS Levels		Low	Low-Intermediate	High-Intermediate	High
Nucleus		1	1	2	2
Functional Modules	Table Handling	1	1	2	2
	Sequential I/O	1	1	2	2
	Relative I/O	-	1	2	2
	Indexed I/O	-	-	-	2
	Sort/Merge	-	-	1	2
	Report Writer	-	-	-	-
	Segmentation	-	1	1	2
	Library	-	1	1	2
	Debug	-	1	2	2
	Interprogram Communication	-	1	2	2
	Communication	-	-	2	2

Each of the NBS compliance levels includes a different pattern of Ansi's definition of null, Level 1 or Level 2 implementation of the nucleus and functional modules within Cobol 74.

In the latest Ansi standard, a nucleus and 11 "functional processing modules" (FPM) were defined. The nucleus has to be present but can be implemented on either of two levels.

Each FPM may be implemented on one or more levels. Some may be omitted completely. Compilers can theoretically be built in any of hundreds of combinations and still legitimately be called ANS Cobol.

Under the 1968 Ansi specifications, there were fewer FPMs, but extreme variations still existed which apparently met the Ansi requirements.

To bring some order to that confusion, NBS imposed a four-tier definition of implementation on top of Ansi's specifications. Compilers had to be defined as being low, low-intermediate, high-intermediate or high implementation of the standards. Government agencies could state which levels were required to meet proposal specifications.

NBS has now applied the four levels it defined for the 1968 Cobol standard to the extended list of FPMs within Ansi's Cobol '74.

Ten of the 11 FPMs in the 1974 standard are required in one or more of the newly NBS-defined Fips levels. The Report Writer module, however, has been omitted from the required list on all levels, including the highest.

Providing details of the NBS requirements and facilities which agencies and vendors have available to them to gain clarification or exceptions to the requirements, copies of Fips publication No. 21-1 are expected to be available from the Government Printing Office in late October or early November, according to an NBS source.

Correction

The California Computer Products, Inc. Model 235 disk drive can be upgraded to the 400M byte/spindle Model 235-4 [CW, Aug. 20].

IBM Encryption Algorithm Set For Fips Establishment by NBS

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The National Bureau of Standards (NBS) has announced plans to adopt IBM's encryption algorithm as a federal information processing standard (Fips).

The algorithm, patented by IBM, will be made available on a royalty-free basis to any manufacturer or user who wishes to use it, according to Seymour Jeffery, division chief of NBS' Institute for Computer Science and Technology Systems and Software.

When the standard is formally adopted by the NBS, any agency wishing to encrypt its data will be required to use this algorithm.

Initially, the algorithm will be implemented in hardware only, and several manufacturers have already expressed interest in developing a suitable chip, Jeffery said. Once in production, the cost for such a chip could be as low as $20.

The security standard is not intended for use "within the guts of the computer system," Jeffery explained, "but rather between terminals and a concentrator or a mainframe."

It might also be used between a controller and a removable mass storage device, he suggested.

Adopting a standard for the industry will prevent any one manufacturer from developing a system which could not be accessed by the peripherals manufactured by another vendor, Jeffery said.

The algorithm is of the block cipher family, Jeffery said. It protects digital data by making it incomprehensible and, therefore, immune to disclosure or undetected tampering. Decryption returns the data to its original form, he explained.

This particular algorithm was designed for use with a 64-bit key. It may also be used conveniently on a 4-, 5-, 6- or 8-bit character, Jeffery said.

Since the algorithm was first published last spring [CW, April 9], no serious negative comments have been received, he said.

In the notice which appeared in the *Federal Register* last week announcing the planned adoption of the standard, NBS asked interested industry members, government officials and Fips point-of-contact agencies to submit any comments by Nov. 1.

After reviewing the comments, NBS will make any necessary revisions and submit the standard to the Secretary of Commerce for approval. Final publication is expected about the first of the year, and the standard will go into effect six months later.

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Says $32 Million Suit Next

Firm Asks Injunction on Sale of Xerox Data Systems

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. – A request for an injunction to prevent Xerox Corp. from selling its Data Systems Division until an unhappy customer is satisfied has been filed here in District Court.

The request, filed by John C. McWilliams and Associates, Inc. (JMA), will be followed by a $32 million breach of contract suit against Xerox, according to Curtis Brannon, JMA president.

A Xerox spokesman said attorneys had just received the complaint and could not comment until they had completed studying it.

JMA and Xerox Corp. submitted a joint proposal to the Church of the Seventh Day Adventists for installation of a Sigma 9 and a 560 and software, Brannon said.

The church signed contracts with both JMA and Xerox, he said. JMA contends Xerox has not honored its contracts, thus preventing JMA from fulfilling its obligations to the church.

The request for an injunction was filed because "we're looking for a solution to our problem, which means we must establish the status quo," Brannon said.

The injunction seeks either to have Xerox honor its contract or ensure the purchaser will do so, JMA attorney Douglas J. Rykhus explained.

Specifically, Xerox failed to modify standard software for compatibility with software from other sources, furnish time to test and check out software and provide technical support for JMA's software efforts, Brannon said.

"We contend Xerox is responsible for our nonperformance, and the church contends we're both at fault," Brannon said.

'Out of Wherewithal'

Xerox's failure to provide JMA with time at specified periods to develop its software caused JMA to incur considerable expense in buying outside time, he said, JMA has "run out of wherewithal," to complete its job, he added.

The firm's offices are closed and JMA is based in an officer's home.

The church served JMA with a 60 day notice of default which expired June 11.

JMA was supposed to prepare applications software in the medical applications and phototypesetting areas, while Xerox was to modify its standard software to accept the JMA work as well as independent equipment such as Computek terminals, Penril modems and Harris remote batch equipment, Brannon said.

In 1973, Brannon was a Xerox employee, familiar with the account of the church, which was issuing a request for proposals to consolidate its DP equipment and people into a central, shared system.

Although Xerox was not interested in bidding on the job, Brannon was, he said. He then went to McWilliams and interested that firm in the job.

JMA submitted a proposal with itself as the prime contractor and Xerox as subcontractor. The church, Brannon said, indicated it would prefer to deal with Xerox directly, and separate contracts were signed in the fall of 1974.

Equipment was scheduled for delivery in late February, but arrived in late March or April, Brannon said.

States Give DP Safety 'Lip Service': Nasis

(Continued from Page 1)

This year's report showed 32 states developed formal written procedures for procuring hardware, 27 for procuring software and 31 for procuring contractual services.

Although leasing remains the most common method of obtaining computers, 1974 brought a sharp increase in the percentage of purchased systems – 18% in 1974, compared with 11% in 1973.

States asked to rank their difficulties in order of seriousness reported relationships with management and user agencies continued to be their most serious external problem.

The most serious internal problem cited by reporting states was associated with "cost overruns," reflecting concern over budget problems, Nasis said.

The number of states with formalized state plans for system consolidation increased to 28 in 1974, but the number of states without plans "is still too large," Nasis chided.

The trend toward centralized control was further evidenced by a 3% increase in the number of employees in the central DP authority, the report said.

In-house training for these employees has increased "dramatically," with 9,346 state employees attending in-house training courses in 18 states reporting, compared with 4,390 in 20 states answering the 1973 survey.

Finally, while state budgets as a whole increased, the ratio of DP spending to that of the whole state budget decreased, Nasis said.

For the 31 states reporting on budgets, the average ratio of DP to the overall state budget was .52%. Actual figures reported by individual states varied from a low of .13% to a high of 3.50%.

In publishing the figures on budgets, Nasis warned the states reporting this year were not the same as those which reported a year ago, a factor that could affect any comparisons made.

Hardware expenditures were down in 1974, the report noted, with overall DP operations costing almost twice the amount spent for hardware. Several years ago, these figures were reversed, Nasis pointed out.

The switch was attributed to greater consolidation of computer hardware, improved operations management, changes in leasing and purchase agreements leading to lower costs and continued realization of "more bang for the buck" gained through use of larger systems.

Personnel costs increased in all classes, reflecting both salary increases as well as increased applications.

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Risk Analyses Aid Choice, Cost of Security Measures

(Continued from Page 1)

system within that organization or even the parts that comprise a system, Courtney said.

Since a security measure should reduce or eliminate a security risk, the user must be able to quantify the risk to measure what benefit he will receive if he lessens or eliminates it.

The two key elements in risk analysis, therefore, are a statement of impact and a statement of probability, Courtney said. The first is an evaluation of how badly an undesirable event could hurt the DP operation; the second describes the probability that the undesirable event will occur within a specified time period.

Both statements are necessary for the user to assess the risk in a measurable variable such as dollars per year, he said.

It is usually harder to measure the probability of an undesirable event's occurrence than it is to measure its impact if it did occur, Courtney said. But statements of the effects of undesirable events without regard to the probability of their happening can't help the user identify which risk areas deserve protective action and which do not, he added.

There are catastrophic events which appear to have such a low probability of happening that they do not justify spending large sums to lessen their potential damage, Courtney noted. The user must match a potential loss with the probability of it occurring to decide what action to take, he said.

Common Sense Best Tool

Common sense may be the best tool in making these probability analyses, Courtney observed.

As an example, Courtney described a hypothetical major corporation which has centralized all its DP facilities into a single location. The company has made no plans for DP support elsewhere in the event of a catastrophic loss of the central facility.

The total costs of such a catastrophe would be $150 million, not just in hardware replacement, but in lost business opportunities, customer ill will and interruption of proper cash management as well.

The $150 million figure alone does not lend itself to any real measure of the problem, Courtney stressed. "It does not suggest how much might reasonably be spent in reducing the exposure," he said.

However, if the DP staff can determine that it might reasonably expect such a loss with the frequency of .003 times annually, the firm has an exposure of $450,000/year and a basis for corrective action.

Given this information, the firm can either tolerate the risk, lower the possible dollar impact by taking measures costing less than $450,000/year or lower the probability of the loss occurring by taking protective measures costing well under $450,000/year.

Users Say Paper Prices Stable

(Continued from Page 1)

shortage" is over. One user said his supplies now arrive in eight weeks instead of 12. Others said they now get 100% of the quantity ordered, not 50% or 80% as previously.

One user, however, said some sizes are more difficult to get now. The vendors seem to be concentrating on standard sizes, he said.

The booming paper costs of a year ago have left their imprint on DP centers, though. More than half the DP managers interviewed said the rising paper costs spurred them to cut down unnecessary report printing.

The technique most commonly used to accomplish this cutback consisted of surveying the center's users about what reports they really had to have.

"You get used to producing so many copies of a report – and then find out nobody wants it," one DPer said.

The paper price hikes also encouraged greater use of computer output microfilm (COM) in shops that already had the equipment, users indicated.

The paper shortage was "a useful lever" to promote COM use, one DPer remarked. "We weren't doing too good a job of selling the idea of microfiche to users before paper costs increased," he said. "Now it has become a noticeably more popular substitute."

Another user said he switched from 6 line/in. to 8 line/in. printing, while others said they now recycle paper by doing some printing on the reverse side of previously used paper.

Other users have switched to lower cost grades of paper.

The paper shortage had still another effect. Several users said they are now ordering all their supplies from one vendor, warehousing paper or signing longer term supply contracts as a result of their experiences in the 1974 paper market.

This survey was conducted by CW staffers Catherine Arnst, Ann Dooley, Nancy French, Patrick Ward and Toni Wiseman.

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Parsons, Plesser Set To Fill Privacy Posts

WASHINGTON, D.C. – Carole W. Parsons has been named executive director and Ronald L. Plesser has been chosen general counsel of the Privacy Protection Study Commission.

The commission, established by the Privacy Act of 1974, will study information practices in state and local government and the private sector.

Parsons comes to the commission from the White House Domestic Council Committee on the Right of Privacy, where she served as associate executive director.

Parsons was also associate executive director of the Health Education and Welfare Department's (HEW's) Advisory Committee on Automated Personal Data Systems, which made the initial recommendations for federal privacy standards with the publication of the HEW Secretary's report in July 1973.

Plesser is a partner in Plesser and Stein, a Washington law firm, and was a staff attorney with Ralph Nader's Center for the Study for Responsive Law. He also served as director of the Freedom of Information Clearinghouse.

STSC Becomes Initial Customer Of Telenet Packet-Switched Net

(Continued from Page 1)

stable," Myrna said.

The first STSC customers will be put into Telenet facilities in September, and some of these will receive dedicated (instead of dial-up) access lines hard-wired with Bell 113B data sets, he said.

At present the APL Plus service uses a network of private lines with time-division multiplexers to serve customers. About 500 access lines are used on the APL Plus net using multiplexers from Digital Communications Associates and Infotron.

As STSC gains operating experience, it will later give up some of these more conventional facilities, Myrna said.

Among the benefits Myrna expects from Telenet are increased throughput capabilities that will allow APL users to get into applications with higher volumes of data. The redundant hardware and automatic switch-over will increase reliability, he said.

Telenet also provides a network buffering capability, which means users can enter larger amounts of data without having to wait for replies from the mainframe, he added.

By using the Telenet facilities, different speeds can be supported that would not be economical using conventional time-division multiplexers, Myrna said. As an example, it will be possible to support IBM 3767 terminals at 33.3 char./sec probably later in the fall, he said.

Initially STSC will serve customers who have IBM Selectric-type and 30 char./sec Ascii terminals. Speeds including 10-, 30-, 60- and 120 char./sec will initially be supported, he said.

The Bethesda-to-Washington link to Telenet is a 9,600 bit/sec DDS line that costs STSC $250/mo plus $400 for a multiple connection port on the Telenet network. On the remote ends, each terminal pays $1.40 per connect hour.

There is an additional charge of 60 cents for each kilopacket of data transmitted over the network. STSC estimates terminals on its APL Plus service will use about 1,200- to 1,300 packet/hour. Each packet contains up to 1,024 bits or 128 characters.

NCR Simplifies Coding Of On-Line Programs

(Continued from Page 1)

scheduling, common disk backup for software displays, dynamic assignment of partition assignments and, again, "improved systems message displays." B3 can be used with Century 200 and more powerful CPUs, the company noted.

Release 8D also includes support for memory-resident, rather than disk-resident, index tables for indexed sequential files. This change reduces the disk operations needed to locate a record and permits better use of system resources, the spokesman added.

The new release also includes software in support of the NCR 658 disk, the unit comparable to IBM's 3330 for the larger Century systems. Availability of the software coincides with first deliveries of the hardware, NCR noted with satisfaction.

Enhancements to other elements of the operating software are said to include automatic propagation of utility routines from a master disk pack, improvements in the time-sharing system utilizing Basic and improvement in compilers, including a reduction in disk pack requirements for concurrent compilations.

The Release 8D software is free to Century users and is available for immediate customer delivery, the company said.

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FBI Intensifying Agents' DP Training to Detect Fraud

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – In response to a decade of increased computer-related crime, the Federal Bureau of Investigation (FBI) is intensifying its training of special agent accountants to enable them to cope with the techniques and controls used to perpetrate these specialized crimes.

The fraudulent use of computers by embezzlers and other white collar criminals has flourished in proportion to the increased use of computers by the various agencies of government, banking and private industry, according to an FBI spokesman.

U.S. Chamber of Commerce statistics show losses attributable to embezzlement and fraud amount to some $40 billion a year. The National Bureau of Standards put losses from computer-related fraud at $200 million last year.

Part of the FBI's increased concern also stems from the fact that the general public doesn't seem aware of, or doesn't care about, white collar crime, the spokesman added.

"White collar" crime is defined as a crime in which no one is shot, beaten or threatened with bodily harm. According to FBI definition, it occurs when company officers and employees have violated their trust.

Some businessmen, unwilling to risk the potentially bad publicity associated with white collar crime, simply mark down losses from fraud and embezzlement to the cost of doing business, according to a Chamber of Commerce survey.

To assure the expertise necessary for agents to deal with computer fraud, the FBI is providing special training in the area of DP and computer fraud to its own special agents, accountants, members of the National Academy and various police agencies which request this training.

There will be no separate division dealing with computer frauds, but the agency is planning to establish specially trained squads of agents, Thus, when a case comes up that requires this particular expertise, the FBI will be able to assemble a squad to handle it.

The training will take place at the FBI academy in Quantico, Va., where a small business computer is being installed. The FBI is presently using mainframes belonging to the Quantico Marine Corps Base for training.

The curriculum for the course is still in the planning stages, the FBI spokesman said, but will include hands-on training with special attention on advanced training in the area of extracting and examining computer-generated records.

The FBI may be called upon to investigate computer frauds involving thefts or embezzlements through the illegal manipulation of input or the physical alteration of a program, the FBI spokesman said.

"An agent may also be called on to investigate alleged diversion and interception of interstate teleprocessing information by persons committing industrial espionage," he said.

Finally, "vital data – patents, formulas, trade secrets – are often stored in computers. Theft or sabotage of this data through destroying or altering it could be a disastrous financial blow to a corporation.

"Such offenses, provided an interstate aspect is involved, are investigated by the FBI," the spokesman added.

Planning Top Priority For DP Center Security

By Catherine Arnst
Of the CW Staff

ATLANTA – The most important consideration in securing a data center is "adequate planning," according to Louis Scoma Jr., president of Data Processing Security, Inc.

Scoma told attendees at a recent conference here that security needs are different with each installation and that a company should place a value on its data center before securing it.

In the area of physical planning, he said, location should be given top priority. "Don't show it off; take it out of public view."

He recommended that the center be placed neither on the first floor nor the basement, nor any higher than a hook and ladder could reach. The best location is between the second and seventh floors, he said.

He also suggested that centers not be built near airport runways or exit ramps of highways and that consideration should be given to what is on the floors above and below.

Scoma especially emphasized companies should not advertise the location of their data centers. "Believe me, the vendors are still going to find you," he said. Suggestions included leaving the data center off elevator directories and removing all signs.

In requiring personnel clearance, companies should perform security checks on people in sensitive positions, such as the tape librarian, as well as on important people.

Of the three types of fire protection systems available – water, CO_2 and Halon – Scoma recommended the latter.

However, he added, no system is adequate without a good detection system. He also suggested that fire extinguishers be available and that custom-fitted fire blankets be made for all equipment.

A company should have practice fire alarms, particularly on the third shift and on weekends. Emergency phone numbers should be placed on all phones and emergency procedures posted.

One method of preventing theft is limiting access control, and Scoma feels all unauthorized personnel should be kept out of the data center.

Scoma listed several methods of restricting access control, in ascending importance. The minimum restriction is a sign on the door saying "No Admittance"; the next is a combination lock, but the code would be very easy to obtain. Third in line is a key, which can always be duplicated.

A coded badge, without the company name, is next. A badge is harder to duplicate, but can be lent to people. A badge with combination would be better, and the most secure would be a badge key system with a printout.

A final method would be fingerprint identification, which Scoma does not recommend at the present time because he said it has a high error rate.

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Con Ed Employees Plead Guilty

DP-Aided Embezzlement Set for Trial After Two Years

By Toni Wiseman
Of the CW Staff

KEW GARDENS, N.Y. – A recent story in the *Long Island Press* reported two men had swindled Consolidated Edison (Con Ed) out of $25,000 with the aid of a computer.

But staff members of that company's public information and legal departments said they never heard of the case. Neither had workers at the regional office where the crime took place.

Part of the reason for this lack of knowledge may be that the crime, which took place in 1973, is only now coming to trial.

One reason for the delay in prosecution, the Queens district attorney's office noted, is that "not being experts in computer billing, it took us a long time to figure out what and how this was done."

Voluminous audits and pretrial motions also delayed action, the spokesman said.

Two former Con Ed employees, George Wise and Thomas Marra, have pleaded guilty to devising a scheme which enabled them to collect their company's bill payments in cash. They altered computer records to show payment had been made to the utility, according to Howard Newman, Queens assistant district attorney and investigating officer for the case.

Both were senior customer representatives and, therefore, had access to the IBM system. As part of their job, they would legitimately use the mainframe to effect various credits and check readings, Newman said.

In the scheme, an "outside" person went to various Con Ed cusotmers who were large consumers of electricity, such as factories and restaurants. He entered into an agreement with them in which, instead of paying their monthly bills to Con Ed, customers gave this representative half the face amount of the bill in cash each month, Newman explained.

The "inside" man, by forging various punch cards, then effected credit on those accounts so it would appear the bill had been paid, he added.

The men used a particular code, called a duplicate sales code, to record a credit in the automated system, according to Newman. The code was intended for use in cases where a customer was erroneously billed twice during the same billing period.

Normally, when two bills were sent out, Con Ed personnel would enter this duplicate sales code to post a credit to the account in the amount of the second bill. This would then appear as a payment rather than a correction of a billing error, Newman explained.

Wise and Marra used this code to credit the first bill, wiping out the debt to Con Ed as if complete payment had been made, he noted. There was a way to check whether two bills, actually had been sent out, Newman added, "but unfortunately this check was not done.

"Ultimately an audit was conducted and investigators were able to determine when the improper credits were put through," he said.

Modus Operandi Deviation

The embezzlement came to light when the two men deviated slightly from their normal operating procedure, Newman said.

Marra and Wise came into possession of various checks which were intended as payment of Con Ed bills from a corporation in Queens.

"Apparently they anticipated receiving these checks because, several days before the checks were even made out, they had already entered a credit into the computer for the amount of the payment," Newman said. The credits were entered June 1 for checks dated June 14, he noted.

When they tried to cash the checks, made out to Con Ed, the bank notified the utility company, which then began a complete investigation. Con Ed discovered a credit had already been put through on that account, even though no payment had been received.

A lengthy audit of the system revealed the two men had been entering this type of credit for a period of some two years, Newman said.

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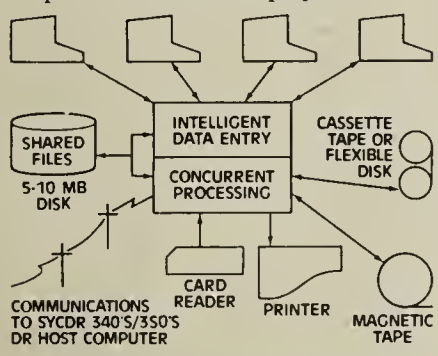

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'74 Loss From Fraud Set at $200 Million

By a CW Staff Writer

LACONIA, N.H. – Out of the estimated 339 computer-related frauds in 1974, the average loss per occurence was over $500,000 and the total loss was over $200 million.

And the odds against going to jail are 33 to 1 – even if someone is caught in relation to this type of fraud, Dr. Ted Linden of the National Bureau of Standards told the National Association for State Information Systems (Nasis) here recently.

Of these cases of DP-related fraud, 85% were not even reported to the police, according to Linden, who quoted figures from a report issued by Robert Courtney of IBM.

The potential for computer-related fraud is getting much worse, Linden said. He compared the potential for computer fraud with airline hijackings and the abuses of "phone freaks" on the telephone network.

"Both of these problems existed for a substantial period of time and all of a sudden they became very acute," he said, predicting "the very acute stage for computer fraud is probably still coming in the future."

Three descriptions of data status were given by Linden. Data confidentiality is the status accorded to data which requires protection from unauthorized disclosure; data integrity occurs when the data agrees with the source from which it was derived and when it has not been accidentally or maliciously altered, disclosed or destroyed; and data security refers to the protection of data from accidental, intentional or unauthorized modification, destruction or disclosure, he said.

'It Takes Many to Know One'

Systems Give Three-Dimensional Look at Brain Cells

By John Hebert
Of the CW Staff

IOWA CITY, Iowa – The old adage, "It takes one to know one," is pure understatement when referring to the study of the brain – in neurobiology, it takes many "brains" to know even one brain cell.

So, at the University of Iowa's Department of Physiology and Biophysics, investigators – have joined forces with computer systems in pioneering a method enabling a three-dimensional look at brain cells.

Dr. Rodolfo Llinas and his colleagues have developed and employed a technique by which an individual nerve cell is visualized from different angles on a display terminal, according to Irene Chegwiden, health sciences editor for the University of Iowa News Service.

In the technique, photographs of a single nerve cell are taken at a variety of successive layers through a high-power microscope.

The images are sent through an image-analyzing system manufactured by the Image Analyzing Computer Co., which in turn relays the information in the form of dot matrices to an in-house, Digital Equipment Corp. PDP-15 minicomputer, Ellen Adams, coordinator of the Division of Neurobiology, explained.

The system stores the information on three axes in order to be able to retrieve it in three-dimensional form, Chegwiden said.

When the images are recalled, they are presented on a CRT graphics terminal; if a copy is desired, a Tektronix hard-copy terminal prints the image on paper, Adams said.

Search for Abnormalities

The "memory" of the computer system allows the form of the cell to be recalled in all three dimensions but, more importantly, the form of the individual nerve cell can be rotated so views that otherwise might be impossible to achieve are available for study, Chegwiden said.

The ability to look at brain cells in three dimensions may aid in discovering minute differences in nerve cells which may signal the existence of abnormalities or disease.

The computer can retain and compare the shapes of thousands of cells, enabling future clinicians to distinguish, in three dimensions, the pathological characteristics of abnormal cells.

"In using the microscope, we are focusing on different planes. But we cannot memorize them, we need a system to remember," Llinas said.

"The computer gives us that system. The information goes into the system's memory, which can reconstruct the cell and rotate it for us when called upon."

In conjunction with the three-dimensional research, Dr. Andras Pellionisz has developed a model of the frog cerebellum as a first step toward organizing the mass of information available on nerve cells.

"Until now, the job of putting together all the data on brain structure has been nobody's job. Today we're in the exciting phase in which areas seem to converge," Pellionisz said.

"A picture is emerging from the pieces – and it will basically be the computer's job to organize it, because our brain cannot keep in mind all the information," he added.

In collaboration with the rest of the team, Pellionisz uses a computer to "grow" a model of a frog's cerebellum from specifications for the various types of cells present in this part of the brain. The cerebellum of the frog is particularly important because it controls all movements.

"We 'grow' the computer models in order to find out how this center works. We can specify the parameters of all the cells by feeding in physiological properties and find out what responses the cells can generate," he said.

Practical applications for "growing" models extend beyond biology and human disease. "It would be very helpful in constructing, for instance, automatic controls for aircrafts," Pellionisz noted.

DOD Official Says User the Culprit In Surveillance Technology Misuse

WASHINGTON, D.C. – The misuse of surveillance technology must be controlled by controlling the user of the technology – not the technology itself, D.O. Cooke, the Department of Defense's (DOD) deputy assistant secretary for administration, told a combined Senate committee during hearings on surveillance and technology recently.

"Technology itself is neutral. The automobile which carries an expectant mother to the hospital can also carry a bank robber from the scene of his crime," Cooke pointed out.

DOD Regulations

The DOD has instituted extensive regulations and controls over the use of high-technology surveillance equipment, limiting the individuals and situations where such devices can be used, Cooke said.

He also cited the Defense Investigative Review Council (Dirc), a "vital ongoing policy advisory group," which he credited with originating a DOD prohibition on the acquisition and retention of information about individuals or organizations that does not represent a distinct threat to DOD personnel, property or mission.

Dirc, of which Cooke is chairman, "has met 32 times since its inception in 1971 and has conducted unannounced surprise inspections of all concerned Defense activities in 19 different areas of the U.S. during this time," he said.

Constitutional Rights

Cooke called attention to Dirc's efforts to ensure the constitutional civil and private rights of individuals and organizations while protecting valid national security interests.

"DOD is going to continue to refine and upgrade the use of technology and use it openly," he said. "We intend to strive for better utilization of existing computer systems and communications networks, especially in the area of command and control of national defense forces in a rapidly developing crisis."

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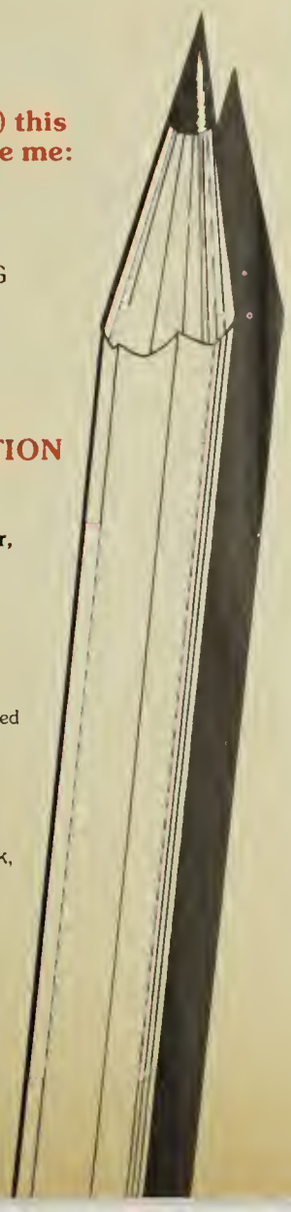

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Editorial

CW Needs Data on Data Base

Computerworld's Sept. 24 issue will feature a special report dealing with data base management. In an effort to poll the interests of our readers in this area, we are running the following survey.

For your convenience, you can use the postage-paid subscription envelope stapled into this issue. Just cross out "Circulation" and write "Editorial" so your vote can be tabulated quickly.

We need as many responses as possible, so fill out the form. We'll report the results of the survey in the Sept. 24 issue.

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1. Which system have you installed?
   _____
3. How long has this system been in operation?
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4. What applications are using it?
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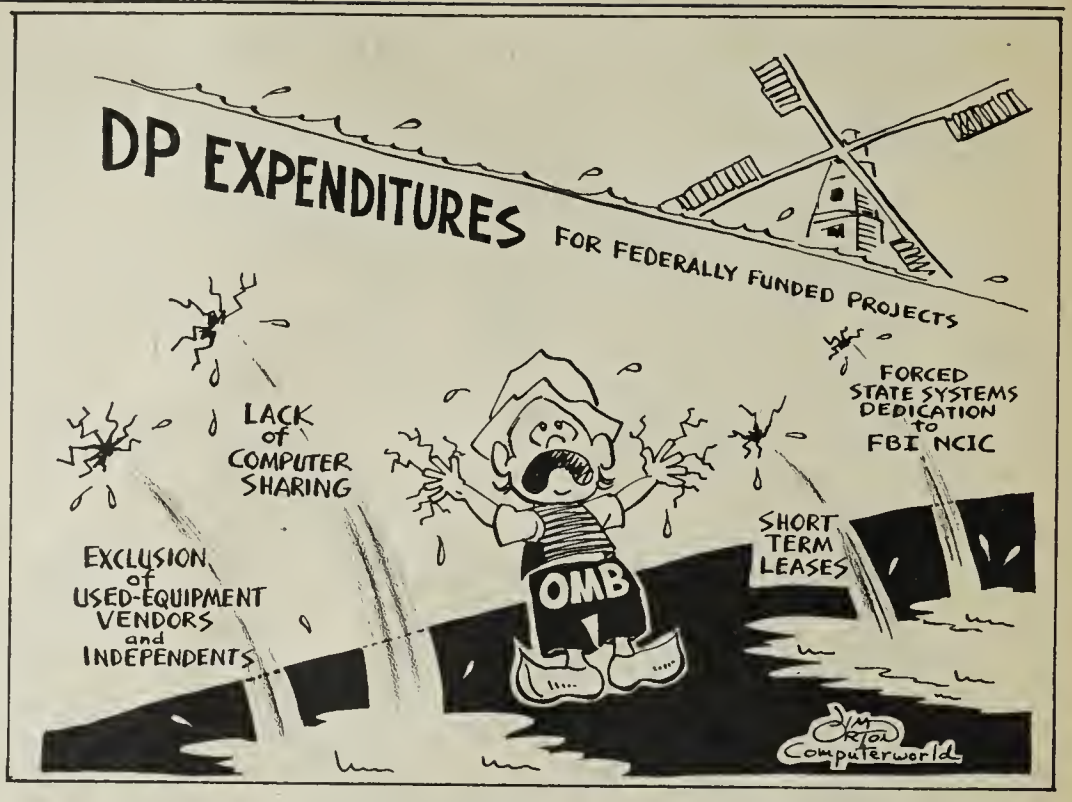
6. How would you rate the capabilities of your data base management system?
   Excellent ___ Good ___
   Average ___ Needs Improvement ___
7. How would you rate vendor support?
   Excellent ___ Good ___
   Average ___ Needs Improvement ___
8. Which CPU are you using?
   _____
9. Do you use a data directory/dictionary?
   Yes ___ No ___
10. Do you have a data base administrator?
    Yes ___ No ___
11. Is the administrator an individual or group operation?
    Individual ___ Group ___
12. What percent of your current data base software was developed in-house?
    ___%
13. What percent of your CPU resources are dedicated to the data base application?
    ___%
14. What types of articles on data base management would most interest you?
    _____
    _____
    _____
    _____

My job function is:
___ Management
___ DP Management
___ Programmer/Analyst
___ Other

Identification (Optional)
Name _____
Title _____
Company _____



'Help!'

Letters to the Editor

AT&T, IBM Romance Not Brewing

The editorial about AT&T and IBM ["Love in Bloom," CW, Aug. 13] was erroneous and misleading.

Computerworld took a number of incomplete, unrelated and out-of-context observations and arranged them in a fashion that implied sinister motives and perhaps illegal actions by IBM and AT&T.

To say, for example, that IBM and AT&T are "openly courting each other again" simply because our respective filings with the Federal Communications Commission (FCC) on the interconnect program are conceptually similar (although arrived at for very different reasons) was totally specious.

IBM's position on the FCC issue was taken independently, as are all IBM's business positions. To use innuendo and unsupported comment to imply otherwise was a disservice to your readers.

John R. Opel
President
IBM Corp.
Armonk, N.Y.

Numbers Don't Always Tell Truth

The report from Shearson Hayden Stone, Inc. regarding IBM and Burroughs as being the only two likely to survive in the mainframe area [CW, Aug. 13] amazed me.

The total assumption was based upon two financial aspects – profit margins and return on assets, along with an error checklist developed by the same firm.

Percentages, figures and statements may not always tell the truth. One can usually make such numbers say what one wants.

In addition, neither Shearson Hayden Stone, Inc. nor I know what goes on behind corporate doors. True, Sperry Rand and Honeywell may have low figures in certain columns, but that may be because they have written off the R&D cost for newly announced systems – who knows?

Considering the absorbtion of a totally different vendor, both Univac (RCA) and Honeywell (GE) have conducted themselves well – financially, technologically and professionally. An example of this is the fact that, to date, Univac has retained some 90% of its acquired RCA users and its latest announcements, the Series 90, have compatibility with both the old 9000 and Spectras.

Financially, Univac has been growing stronger the past 11 quarters. Honeywell also, although not to such a great extent, has provided well for its users with its GCOS spanning both its past and present systems. Granted, their financial pictures could show improvement – whose couldn't?

No doubt about it. A supplier such as IBM does have the working capital to reinvest, and because of its associated status does have the upper hand in many cases. But I would be the last to comment as such being the prerequisites to survival – or, even more important to me as a user, the basis for a decent mainframe supplier.

David Klotz
Pittsburgh, Pa.

CW Should Make Own Studies

Without presenting evidence, Herb Grosch destined NCR mainframes to extinction [CW, June 25]. Now, again without certification or proof, *Computerworld* echoed this condemnation [CW, Aug. 13] by accepting the opinion of a stockbroker as expertise worth reiterating under a full-page headline.

Unsubstantiated charges of this magnitude resemble the techniques of scandal sheets and yellow journalism.

If CW deems forecasting is a desirable characteristic of a responsible publication, it should conduct its own independent studies. Let CW investigate the directions and intentions of mainframe manufacturers, then document and publish the study over its own seal.

This would certainly serve the computer user and potential user better than prophesizing and parroting harbingers of doom.

Donald C. Wesley
Ludlow, Ky.

Clarification of UVM Forecast

I would like to clarify the comments made about Levi Strauss & Co. in "UVM Scan Code Full of Promise – But Little Progress" [CW, Aug. 13].

Levi's will be working with Federated Department Stores, Inc. and Foley's in conducting a test using the voluntary Universal Vendor Marking (UVM) code. The joint venture will involve retailer, apparel manufacturer and equipment suppliers in determining the feasibility of the proposed National Retail Merchants Associations (NRMA) standards.

Foley's in Houston will be the site of the test, which will run for approximately one year beginning the early part of 1976.

Levi's favors standardization of source labels as adopted by the retail industry and fully supports the NRMA's work with the voluntary UVM code. The three-to-five year timeframe was our estimate of when the majority of apparel manufacturers will begin providing the UVM code on their garment labels.

Lance G. Campbell
Manager
Marketing Systems Development
Levi Strauss & Co.
San Francisco, Calif.

(Other letters on Page 12.)

Better Honey Than Vinegar

Computerworld, the various professional and scientific societies and federations thereof and a sizable number of senior individuals have been approached by friends and supporters of Valentin Turchin, a distinguished Soviet computer scientist. As is unfortunately often the case, his effort to be open and liberal within the closed Russian society has brought down the wrath of the authorities. Now he feels that for the sake of his family, and to remain active in his profession, he must leave his homeland.

Moscow is obdurate: no exit visa, even though an academic position is available in the United States.

One of the major "baskets" of the Helsinki conference was directed to just this problem – the free movement of artists and scientists – along with other artifacts of cultural exchange. What is needed now is an expression of support for the application of these good resolutions. And that support, even when voiced by technical people and organizations, and only to their counterparts in the USSR, does often influence officialdom.

As an example of how someone like me can try, here is the letter I've sent to the vice-president of the Academy of Sciences. Please excuse the rodomontade: the addressee isn't likely to know who I am, and the politicos certainly don't!

6 August 1975

Academician A. Logunov
Vice-President
Academy of Sciences of the USSR
Moscow, USSR

Dear Academician Logunov,

I have had many pleasant and fruitful contacts with Soviet scientists in the computer field, and in earlier days when I was active in our space program, with your representatives to international meetings in astronautics. Recent interest in both scientific and economic applications of very high speed computers, while I was director of the Center for Computer Sciences and Technology at our National Bureau of Standards, led me to become involved in the export control problem, and in the less sophisticated military and political considerations which often hamper scientific cooperation.

I became aware at that time, however, that academicians could often advise the regime in a mutually helpful way. And since then, the shared excitement of Soyuz-Apollo, the increased exchanges encouraged at Helsinki, and – not a minor item at all – the commercial cooperation between our great countries, all lead me to believe that we scientists can help smooth the path toward good political relations.

As vice-president of the Association for Computing Machinery I have been informed of a problem involving one of our Russian members, V.F. Turchin. I do not know him personally, as for instance I know A.P. Ershov from my visits to Moscow and Novosibirsk and his several visits in the United States. But I understand Turchin has applied for an exit visa, and has been offered a university post in this country.

In view of the proposed clauses of the Helsinki agreement now under consideration by our heads of state, and in view of the increasingly rewarding scientific and technical exchanges we both hope to see approved, I should like to solicit your support and that of the Academy in the matter of our fellow worker, Professor Turchin. I am sure that if he comes to the United States it will be regarded as evidence of detente and of the growing good will between our countries.

With my own best wishes for better relationships in science,

Sincerely yours,

H.R.J. Grosch
Vice-President, ACM

Let's hope such letters will help. We don't come with completely clean hands, we Americans – but most of us believe in openness and freedom. Someone who stands for those ideals in a harsher society deserves support.

Herb Grosch

Users Have Line of Defense

Preprinted Contract Forms Not Always the Last Word

In the earlier parts of this ongoing series, it was noted that, if a computer fiasco occurs because the vendor failed to provide reliable and complete information to the buyer, the law provides for the written contract to be set aside, even though it may be years afterward that the buyer realizes the vendor did not carry out his legal duties.

Putting aside the written contract, however, leaves open the question as to what type of redress is available in the courts to a wronged user. This article addresses this important aspect of computer fiascoes, together with a description of some of the techniques a wronged user has available to him to find out what the true facts are.

The Taylor Report
By
Alan Taylor, CDP

Computer contracts normally are preprinted forms which include "hell or high water" clauses that greatly limit the right of a wronged user to make any practical recovery. However, these contracts are often not the only agreements that have occurred between the user and the vendor – and a contract is simply another agreement.

Often, an earlier oral or written agreement to rent or purchase the computer system is made before the contract forms are prepared or completed. Normally, this earlier agreement occurs when the buyer tells the vendor he is accepting the vendor's proposal.

These earlier agreements, however, are not normally enforceable in law because of the existence of the later, preprinted agreement. Faced with two agreements dealing with the same subject matter, the law uses its own rules to choose between them and regards one as unenforceable although valid. Under these rules, the preprinted forms have total priority, provided they themselves are valid.

The legal logic that permits firms to enter with impunity into agreements they believe are unenforceable as a matter of marketing tactics escapes me, but that these valid-but-unenforceable contracts exist is clear.

Benefit of the Bargain

The importance of these earlier contracts in the case of computer fiascoes arises from a legal distinction dealing with the crucial matter of how much damage recovery can be made. Under these rules, the type of damage recovery available from a breach-of-contract action is often more advantageous than the recovery available from other actions, so far as repairing the results of present-day computer fiascoes.

This is because, under contract actions, the wronged computer user can not merely recover the actual losses to date, but may also be able to obtain the advantages he would have gained if the contract had been kept.

This technique of being able to recover damages based upon what would have happened if the contract had been kept (technically called "benefit of the bargain") contrasts with other legal recovery philosophies that are used in cases of fraud, innocent misrepresentation and failure to warn.

Under these philosophies, a user only has the right to be put back into the financial position he would have been in if he never had heard of the computer. Particularly for new users, or for people entering on new applications, the difference is important.

Effectively, what it means is the right to profit from the computer venture may only be available if there was a valid contract of some form between the user and the computer vendor. So, when a preprinted contract is overturned for some of the reasons that have been discussed earlier, the existence and terms of the earlier valid-but-unenforceable agreement can suddenly make the difference between a computer user being able to make sufficient recovery to restart operations, rather than just being able to pay off 50 cents on the dollar to his creditors when faced with a fiasco not of his own making.

Punitive Damages

The only other at-all-normal philosophy which can provide for more than simply returning a user to his earlier financial position involves "punitive damages." However, no computer user, no matter how wronged, (and punitive damages are only available in cases of fraud or gross negligence) has a right to expect such awards, although he certainly has a right to ask for them. Such damage awards are totally a matter of discretion and, so, cannot be relied upon being available even to a successful litigant.

Other practical matters are involved in obtaining court relief for a computer fiasco. The user may be afraid his computer vendor may cut him off from service and so ruin his operations during the legal proceedings.

He may be uncertain whether the facts as he knows them about the vendor's conduct can be proven to the satisfaction of a judge or jury. He will often be uncertain as to what the facts really were, particularly during the original negotiations.

The legal process has many ways of assisting in such matters once a claim is filed. These include:

- Temporary Restraining Orders. These can prevent the vendor from pulling out the system or vital maintenance.
- Interrogatories. These can force answers to specific questions.
- Depositions. These permit the user to question under oath the vendor's employees – whether they are service technicians or the corporation president himself.
- Discovery. These orders give the user access to the documents normally kept from him by the vendor, which may be needed to show what the vendor really knew about its own products and services, etc.

How to protect one's rights without court action will be addressed in the next part of this series.

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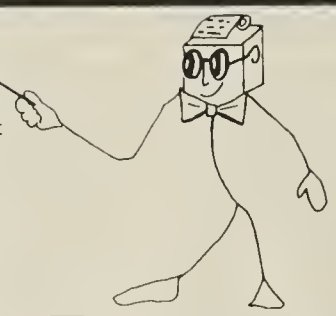

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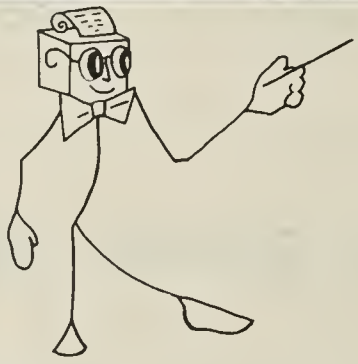

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Letters To the Editor

Incredibility Incredible

I find IBM's inherent incredibility at the verdict and size of the award in IBM vs. Catamore [CW, July 9] inherently incredible.

What else did it expect from a jury made up of laymen from the community in which the defendant is located? What could it expect from any jury which is asked to compare the Big Blue multibillion dollar giant of Armonk to a small, family-owned business?

The precedent in this case has done more for "professionalism" in DP than Ken Lord could with a dozen bills backed by the Society of Certified Data Processors. From now on, the DP community – hardware and software vendors, service bureaus, consultants and time-sharing vendors – better realize caveat emptor does not apply when you possess expertise in a complex art and the public is relying on you for advice.

Richard J. August
N. Kingstown, R.I.

Making Comparisons

Women in DP may earn less than men [CW, Aug. 6], but it remains to be seen whether discrimination is the cause.

Men characteristically get out of school, get a job and stay with it.

The women's statistics are heavily influenced by people who, for better or worse, drop out of the labor force for 15 or 20 years to raise children. When they return, they often take low-level jobs totally unrelated to prior education.

If we are going to make comparisons, they should be between women who have stayed on the job vs. men who have stayed on the job – which is to say, the comparison groups should be comparable.

In the meantime, I keep remembering a recent meeting on the same subject. A woman in the audience complained she was tired of seeing promotions go to men who had less experience and were, in her opinion, less qualified.

Several men in the audience said they had exactly the same problem.

Joseph T. Rigo
New York, N.Y.

Upgrade to Century 251

La-Z-Boy Chair Co. [CW, Aug. 6] uses an NCR Century 251 system at its Monroe, Mich., headquarters, not the IBM 360 mentioned in the story.

The NCR Century 251 was installed last year as an upgrade from an NCR Century 200.

D.J. Muckerheide
Vice-President
NCR Corp.
Dayton, Ohio.

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Random Notes

CW Soliciting Articles For DBMS Special Report

In the *Computerworld* issue of Sept. 24, a special report on data base management systems (DBMS) will include both tutorials on various aspects of the systems and articles outlining user experiences. Contributed articles are welcome, subject to the following basic guidelines.

First, please clear the subject matter with the editor, Don Leavitt (call 617-965-5800, collect). All articles should be user-oriented and not vendor arguments for specific products, and they should be limited to about 1,000 words.

Deadline for all copy for the special report is Sept. 4. Articles should be sent to Leavitt at CW, 797 Washington St., Newton, Mass. 02160.

Adabas Available for DOS Users

RESTON, Va. – Installations with IBM's DOS, DOS/VS or DOS under VM/370 can utilize the most recent version of Adabas – the Adaptable Data Base System – now available from Software AG. Previous versions were limited to OS and OS/VS users.

No modification of a user's DOS environment is required to use Adabas, and the capabilities of this version will be comparable to, but one release behind, those of the older, OS-oriented version.

Adabas for DOS can be leased for from $1,667/mo, for five years, to as much as $3,000/mo, under a six-month plan. Purchase price of this version is $80,000 vs. $120,000 for the OS implementation.

Software AG is at 11800 Sunrise Valley Drive, 22091.

Workshop Topic Data Portability

LONDON – A two-day workshop on European Standards for Data and Information Portability, will be held at the City University, here, on September 29 and 30.

Organized by the British Computer Society (BCS), the workshop will cover topics from paperwork, to software transportation standards to portability in theory and in practice. Inquiries and registration requests should be directed to Technical Dept., BCS, 29 Portland Place London W1N 4HU.

Correction

Using the APL-oriented Financial Planning System on Scientific Time-Sharing Corp.'s network [Couger on Education, CW, July 13] entails neither monthly minimum nor surcharge. Rather, it is available for $12/hour and 65 cent/computer resource unit used, the company said from 7316 Wisconsin Avenue, Bethesda, Md.

Simplifies Problem Solutions

Reynolds Wraps Plans Around Models

By Don Leavitt
Of the CW Staff

RICHMOND, Va. – When Reynolds Metals Co. decides to make a new product and send it out into the real world to see how it sells, chances are the "real world" has already been simulated through a sophisticated APL time-sharing system.

Facilities provided by APL Services, Inc. in Trenton, N.J. have become more and more important to Reynolds' decision-making process since it started using them five years ago, according to C.D. Lenhart, director of management sciences at the aluminum company.

Lenhart and E.W. Moore, a member of the management science staff, explained the situation. Usually the solution to a problem, whether it is a question of plant expansion or a change in production flow, is simplified by use of a model incorporating factors relevant to the decision under study.

The model, a representation of the "real world," may be a pilot plant. If, on the other hand, the situation cannot be expressed in physical terms, it can often be developed into a computer-based model with logic built up through a set of mathematical expressions. For this, Reynolds uses the compact notation of the APL language provided by the time-sharing service.

About 75% of Reynolds' use of the APL service is used for production planning, but it also serves for evaluation of new facilities, "shelf studies" for the marketing department and for financial planning on a large scale, Lenhart noted.

Forecasting System

Reynolds has also developed a marketing, profit planning and forecasting system for the consumer products division, he said.

Originally the peculiarities of APL notation were considered too complex for user departments, and Lenhart's technicians created all new programs. The users activated the models by entering data in terms that were familiar to their own operations.

This division of labor has worked reasonably well, a member of Lenhart's staff said, but lately a number of end users have been pushing to work with the APL code itself, and some classes have been held to satisfy that desire.

Outlining the benefits he sees from use of the APL facilities, Lenhart said the company had done "extensive" work to determine the effect on sales of advertising and promotions. "We also use the models to determine the price differential

(Continued on Page 14)

Informatics Offers Users VM/370 Services on Remote Network

FAIRFIELD, N.J. – A growing number of users are becoming aware of a remote computing network and related services being offered by Informatics, Inc., the company known up to now primarily as the vendor of the Mark IV file management packages.

The network is run by the company's Data Services Division and is configured around a pair of IBM 370/158s located here. Multiplexers in the network are currently located in New York, Boston, Washington, D.C., Atlanta, Cincinnati, Chicago, Dallas, Los Angeles and San Francisco, a division spokesman said.

Customer service is keyed primarily to IBM's Virtual Machine facility (VM/370) and both OS and the Conversational Monitor System (CMS) portion of VM. Interactive time-sharing is available under CMS, batch processing under OS and remote job entry under either environment, Informatics noted.

Available languages include a VS-oriented Basic, Cobol, PL/I, Fortran, the extended Fortran (Watfiv) from Waterloo University, RPG and an Assembler. An executive routine and the General Purpose Simulation System (GPSS) are also provided.

Surrounding these languages are programmer-support tools similar to those of most major networks: an integrated symbolic debugger, a selection of sort programs, a test-data generator and an interactive data editor. The facilities of Mark IV are available in both interactive and batch versions, the company added.

Again in common with other remote computing nets, this one provides the facilities of data base management systems (DBMS). IBM's IMS is available for both interactive applications development and for production work. Model 204, a DBMS recently acquired by Informatics from Computer Corp of America, is also on the net.

The Informatics net supports a number of low-speed terminals; medium-speed units compatible with IBM's 2780, 2770 and 3780; and programmable terminals and small-scale computers such as IBM System/3s. Large-scale 360s and 370s operating with ASP, Hasp or JES facilities can also be linked to the system with a newly installed capability called Echo.

Network headquarters is at 6 Kingsbridge Road, 07006.

Cincom Has Entry Environ/1

CINCINNATI – Users working with teleprocessing can gain a partition that is effectively larger than the main storage available without virtual hardware or VS software by using the Total data base management system and Entry Environ/1, an enhanced on-line control monitor just introduced by the Total vendor, Cincom Systems, Inc.

This virtual partition support is available on IBM 360s and 370s operating under conventional OS and DOS environments. There is no need for dynamic address translation equipment, which isn't even available for most of the CPUs expected to use the monitor, a spokesman emphasized.

However, if a user has an IBM 370 and VS software, both Entry Environ/1 and the older but compatible Environ/1 systems will optimize paging, performance and throughput for the on-line operations they support, Cincom noted.

This latest version of Environ is said to simplify the novice's entry into on-line operations. A special Cobol compiler produces paged and reentrant code, and the task-threading capabilities provide high-level performance, the vendor said.

Entry Environ/1 is a conversational system, Cincom continued, and this enables it to maintain a continuous state of communication with each terminal on the network. No statement of the maximum number of terminals or tasks that can be supported concurrently was provided by the spokesman.

Even though the monitor supports a virtual partition on non-VS machines, main storage usage is minimized by both the reentrant code generated by the Cobol compiler, which allows sharing of program code, and the use of Total, which allows the sharing of data.

The latest Environ provides a set of service functions for dynamic sign-on and security control, message switching and broadcasting, CRT screen format display and local and remote support for IBM 3270 terminals.

Any IBM 360 or 370 with Total can be used with Entry Environ/1, the vendor said, and the monitor is available now for $275/mo in its minimum packaging.

Cincom is at 2300 Montana Ave., 45211.

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'Etos' Allows Multiterminal Use of PDP-8

HARTFORD, Conn. – Users of Digital Equipment Corp. PDP-8 Models E, F and M can get more out of their systems than is available under DEC's OS/8 software by utilizing the Educomp Time Shared Operating System (Etos), Educomp Corp. said.

OS/8 is a fine operating system for the "eight," Educomp said, but it supports single-user mode only. Etos allows multiterminal use of OS/8 with full facilities of the operating system available to each user.

The system uses virtual concepts allowing 32K-word work areas to a number of users simultaneously. The system is also multilingual, the vendor said, explaining that it supports Assembler, Fortran, extended Basic and Educomp's own version of Cobol.

The language processors can run concurrently with a batch job stream. Detached job support and interjob communication are provided, along with a spooler subsystem for faster handling of printer output.

A special Etos disk handler is said to enhance system performance by keeping a job active until just before it is swapped out of memory for a higher priority task.

Meanwhile, a system scheduler optimizes time-sliced use of system resources for both I/O-bound and CPU-bound jobs. The system monitor provides I/O buffering.

A 16K PDP-8 with omnibus, clock, power fail/auto restart option, Educomp's TSC8-75 and a DEC RK8e disk subsystem with two drives is the minimum Etos configuration, the independent said.

The complete Etos package, including hardware "fix," is available now for $4,900 from Educomp at 196 Trumbull St., 06103.

SI Packages Provide Support For Users of Interdata Minis

LEXINGTON, Ky. – Users of Interdata Corp.'s 7/32 and 8/32 minis have an ever-growing selection of system-oriented and application-oriented software from independent vendors.

Software Innovations Corp. (SI) here has a sort/merge, an indexed sequential access method and a product that links the storage capabilities of Interdata's chained file structure with the access efficiencies of its contiguous file system.

Software Innovation's Sort/Merge (Sism) puts no restrictions on the number of input, output or key fields other than those imposed by the user's system because of core size or the number of logical units. Thus, according to SI, any number of input files may be used to produce a variable number of output files using any number of sort keys.

Input and output files may have different record lengths, and actual record lengths may be overridden, providing padding or truncation during processing. Sort keys may be used to set up either ascending or descending sequence, and sort fields may overlap. Sism operates in a 24K partition, the vendor said.

Isam Support Package

SI's Isam support package makes use of an index file maintained and processed by the Isam routines. Data files indexed may be any of the file structures supported by Interdata's OS-MT, SI said.

The Isam routines operate externally to the operating system file manager and may be CALLed by high- or low-level languages.

Sofblock is SI's program for combining the storage efficiencies of chained file structures and the access speed of contiguous files. This package allows the user to block more than one record in a sector, while still being able to access each record directly in a single I/O operation.

Sofbloc operates as a subroutine and can have up to 32 individual files open at the same time. This package sells for $300.

SI's Isam is available for $650 and Sism has a one-time cost of $450, the vendor said from 404 Lafayette Ave., 40502.

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We've been so busy developing our powerful GCS 2100 system, we've never taken the time to tell enough people what a great system it is.

How efficient it is (average of 80% reduction in errors — 35% to 85% faster document handling). How reliable it is (less than 1% downtime). How simple it is (operator training time less than 8 hours). Or how economical it is (10% to 40% savings in data preparation costs).

And our competitors have loved us for keeping it such a secret!

The GCS 2100 is a complete data entry system: it lets you collect and edit data at the source (data is actually edited while it is being keyed); store the data on disc; then transfer the clean data to an output media like magnetic tape. (Data already on tape or cards can be re-submitted to the GCS 2100 for editing, reformatting, etc.)

The GCS 2100 can interface up to thirty-two telephone lines. Card readers. Medium and high speed line printers. Four-tape drives. Four fixed or moving head discs.

All on a single system.

The GCS 2100 provides extensive I/O functions so you can transfer data to and from disc storage and other I/O devices.

The GCS 2100 can accommodate up to 64 local or remote terminals: local terminals can be located up to 2500 ft. from the system's CPU. You get faster, more accurate data entry for functions like payroll, shipping, receiving and manufacturing, because the person most familiar with the data does the keying.

The GCS 2100 also offers data entry from remote terminals (it can handle up to five remote terminals over one dedicated telephone line).

A Programmable Extension Package (PEP) extends the power and the flexibility of the 2100 system: up to 255 PEP tables provide capabilities like automatic data insertions; range and value checks; table look-ups; logical tests; character expansion; and data dependent format switching.

These tables are not job assigned, so they can be used on several different jobs.

A library of over 100 special edits is also available. (If there isn't an edit for your needs, we can design one.)

The GCS 2100 also provides up to 99 format levels per job; up to 255 balance accumulators; variable length record and blocking factors; and up to 255 jobs stored in the system.

GCS 2100 Peripherals: GCS DataTone — data entry via Touch-Tone® telephones. GCS DataTel — remote batch communications.

For more Great Computer Secrets, contact Tom O'Brien, Director of Domestic Sales at General Computer Systems, Inc., 16600 Dooley Road, Addison, Texas 75001. (800) 527-2568/9 toll free. In Texas (214) 233-5800.

See us at info75

GCS 2100
general computer systems inc

Reynolds Uses APL For Writing Models

(Continued from Page 13)

between Reynolds' and other products that will maximize our return on investment."

In production planning, the APL model is used for extruded products, which constitute a large part of Reynolds' operations. When a salesman in the field gets a request from a customer for a specific extruded shape, he sends a drawing to one of Reynolds' plants, which will prepare specifications of the product, with such factors as the type of alloy to be used, how it should be tempered, the dimensions of the extrusion and other pertinent information.

The data is then run through the APL system to evaluate production alternatives and produce cost estimates. These go back to the salesman who presents them to the customer. If the customer is satisfied and places an order, the production control department determines which plant will get it, if there is an option.

Production control, working through the plant industrial engineering, then turns to another APL model to determine what sequence of operations is required to produce the new extrusion, how many man-hours will be required and overall manufacturing costs.

In its regular plant operations, the company uses the model to determine where bottlenecks might occur and how to eliminate them before they take place.

Reynolds has nine terminals accessing the APL system. Two are in the management science department here; the others are at its extrusion plants, production development center, packaging pricing department and experimental division.

To Lenhart and Moore, the beauty of the APL system is its flexibility. "You can write a program in one-tenth the time required in many time-sharing systems," Lenhart said. With the typical batch operation, he continued, "you have to wait until the program is keypunched and taken through the system to get the answers back. That is what the management sciences department did prior to getting the APL time-sharing system."

Rapidata Extends Network With 'Rapidvoice,' 'Rapidlink'

FAIRFIELD, N.J. – Rapidata, Inc. has recently implemented extensions of its remote computing services in two apparently diverse but potentially interacting directions.

Rapidvoice, an audio response service, is now available nationwide, a spokesman said. This capability is used largely for inquiries and data entry to a data base installed on Rapidata's computers.

In effect, Rapidvoice transforms any telephone with its own or an auxiliary push-button "dialing" pad into a terminal device. Data entered through Rapidvoice can be accessed and used at conventional terminals as well, the network noted.

At the same time, a computer-to-computer facility, already available for OS-oriented Rapidata users, has been adapted to DOS shops as well. Rapidlink-DOS transforms the user's IBM 360 or 370 running DOS or DOS/VS into an intelligent IBM 2780 in terms of the CPUs at Rapidata's center.

Since the net has Digital Equipment Corp. Decsystem-10s and Honeywell (formerly GE) 437s as well as an IBM 370, the capabilities available to the DOS shop through this linkage extend to time-sharing and communications support – including Rapidvoice, a spokesman acknowledged.

This would allow a user with an in-house, batch-oriented system to put his data base on the Rapidata net during normal business hours so that salesmen and others who need current information could tap into it during the course of their work. Then the data could be brought back to the user's CPU for batch work on second shift.

Since Rapidlink can in fact be accessed by any number of CPUs at user sites, the computing facilities at Rapidata could serve simply as a means for message shifting between computers at different locations within the user organization.

Used in this manner, Rapidlink would bring Rapidata "very close" to being, in effect, a specialized common carrier, perhaps subject to Federal Communications Commission jurisdiction, one observer noted recently.

Rapidlink executes in a single DOS partition – of 11K to 200K bytes, as defined by the user – and requires "minimal resources," enabling the user's in-house system to continue most of its normal workload, Rapidata said.

The network headquarters are at 20 New Dutch Lane, 07006.

Service Aids Building Budgets

PRINCETON, N.J. – Bankers and others concerned with construction projects can use a computer-based service provided by Wood & Tower, Inc. to gain individual analyses for nearly 150 different building types anywhere in the U.S.

Responding to a client telephone call, a vendor staffer inputs a description of the building to be constructed. The system reviews case histories of actual buildings put up over the past four years.

Results are readjusted to local labor and material costs for the area being considered and factored to reflect the cost of money.

Within four hours, the client receives a return phone call with a verbal report. A printed copy is sent out the same day, Wood & Tower said.

The company charges $20 per building for its budgetary building analysis, regardless of building size, a spokesman added at Research Park, 08540.

'Bancall' Analyzes Banks' Financial Data

ANN ARBOR, Mich. – Using the Federal Reserve Board's call reports for more than 14,200 banks, the Bancall service now on the remote computing network of Cyphernetics permits analysis of any or all of 200 line items of individual banks or bank groups.

Built-in financial models simplify in-depth studies of 12.5 million items of information taken from "uniform condition and income" statements that span the past five years.

Performance analysis, market share studies, acquisition prospect screening, branch location studies and correspondent surveys are among the capabilities made possible with Bancall, Cyphernetics said.

The service also includes integrated report capabilities which allow the user to screen banks for inclusion in an analysis based on a number of criteria.

Selection Bases

Selection – or exclusion – can be based on Federal Reserve district, state, county or standard metropolitan statistical area. Charter class, total assets and total deposits are also criteria that might be specified, the network's spokesman noted.

Individual schedules, parts of schedules or complete statements for any number of banks may be analyzed using either standard ratios or ratios specified by the user, he said.

Links to other Cyphernetics services allow the bank officers or analysts using Bancall to include extended financial modeling, time series analysis, demographic data and graphic presentations of what would otherwise be tabular data.

Bancall and the other services may be used with any standard remote computing terminal and can be reached from most metropolitan areas in the U.S.

The Cyphernetics division of Automatic Data Processing, Inc. is based at 175 Jackson Plaza, 48106.

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POWERFUL ERROR CORRECTION CIRCUITS

Cambridge is the *only* independent supplier to build error correction logic into its 135 add-on memory. All single-bit errors are automatically detected and corrected; the error locations are recorded for later failure-anticipation analysis. All multi-bit errors are detected. This is accomplished completely apart from IBM circuitry – assuring simple problem identification.

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Cambridge is the *only* supplier of 135 memory that enables a user to add or delete sectors of main memory with just a simple switch setting. Any 64K-byte sector of 370/STOR 135 can be dialed out while the balance of memory keeps running – a feature that maximizes your system availability.

INNOVATIVE MAINTENANCE PANEL

Cambridge is the *only* supplier of 370/135 memory that provides a user-operated maintenance panel for fast and simple fault isolation and diagnosis, and the ability to remove either IBM-resident or 370/STOR 135 memory completely from operation with just a turn of a dial. This provides both backup of IBM memory and off-line exercise of 370/STOR memory.

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Cambridge's unique interface design minimizes the time and effort of installation. 370/STOR 135 requires less than half the number of interconnect cables and cards used by other suppliers. You can easily install Cambridge memory in less than a single shift, with a minimum disruption of production operations.

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Cambridge is the *only* supplier that has designed its 370/STOR 135 memory for expansion beyond its current limit of 512K bytes. Right now, you can get either standard IBM-size modules, or custom modules, in any configuration up to 512K. In the future, you will be able to expand up to one megabyte. That means your investment in 370/135 hardware is protected for years.

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Includes Processors, Interface

Modcomp Adds Communications Family

FORT LAUDERDALE, Fla. – Modular Computer Systems, Inc. (Modcomp) has introduced communications processor versions of the Modcomp II and Modcomp IV general-purpose CPUs and a high-performance communications interface subsystem.

The Model 2 universal communications subsystem can interface as many as 256 full-duplex synchronous and/or asynchronous lines to any model Modcomp II or IV processor. Each chassis connected to the universal controller may contain one to 16 dual line interface modules permitting up to 32 lines per chassis. These lines may be any combination of synchronous and asynchronous.

The Model 1907 universal subsystem controller provides all logic necessary to communicate with the attached communications lines, Modcomp said. At the heart of the controller is a high-speed, solid-state random-access memory (RAM) containing 64 bits of storage for each full duplex line.

Parameters maintained in RAM for each line may be modified by commands from the computer or status changes from the line interface modules, the company noted.

The Model 1930 universal communications chassis contains the power, clock source, controller bus interface and rack-mounting hardware for up to 16 dual Line Interface Modules (LIM).

Fifteen separate bit/sec rates are supported by the chassis clock source. Each asynchronous line interface may select one of these 15 rates under program control. The chassis is available in single- or dual-port models.

The Model 193X plug-in LIMs provide character assembly/disassembly for two full-duplex communications lines. Available in asynchronous and synchronous versions, the LIMs can be mixed in any given chassis.

Asynchronous modules are available for either RS-232 (Model 1931) or current loop (Models 1932, 1933) lines at speeds up to 19.2 kbyte/sec.

Communications processor versions of the Modcomp II and Modcomp IV offer a set of hardware-implemented macro instructions for processing communications data.

In addition, they provide a direct memory path for transferring data between the processor and the communication lines via the Model 2 universal communication subsystem. This transfer takes place on a block basis without program intervention, Modcomp said.

A major feature of the communications processors is the direct memory interface (DMI) for the Model 2 universal communications subsystem. This DMI provides 256 full-duplex direct memory access channels to the communications controller.

Since the DMI multiplexes transfers to and from memory, all 256 channels may be active simultaneously, the vendor noted.

Major differences between the II/CP2 and the IV/CP are memory size and memory interface. The Modcomp II/CP2 is expandable to 128K bytes of direct addressable memory, available with either 800 nsec or 1 μsec cycle time.

The DMI interface on the Modcomp II/CP2 shares a memory port with the central processing unit; its data transfers occur on a cycle-stealing basis.

With any of the systems, a full range of supported peripheral devices are available to tailor system configurations to specific applications.

System costs vary depending upon the total configuration. Base price of the Modcomp II/25CP2 including 32K bytes of memory, real-time clock, power fail-safe and console controller is $16,000.

A Modcomp IV/25/CP including 32K bytes of memory, real-time clock and power fail-safe costs $29,500.

The Universal Model 2 is available in several capacities; the 32-line controller costs $3,000 and the 256-line controller is priced at $12,000. Other models can control 64 to 196 lines and are priced accordingly.

LIMs for synchronous or asynchronous lines with full modem control are $550 per dual line unit.

Currently in production, the Modcomp II/CP2 and Universal Model 2 are available now. Initial deliveries of the Modcomp IV/CP will be made later this year from 1650 West McNab Road, 33309.

Data General Offers Software To Support DCU/50 Facilities

SOUTHBORO, Mass. – Data General Corp. has added supporting software for its communications subsystem.

The Communications Access Manager (CAM) software package includes line-handling support for local asynchronous lines, remote asynchronous lines with modem control, synchronous lines (with or without modem control) and the DCU/50-based communications facilities.

The DCU/50 controller operates as a preprocessor, using CAM software to handle data lines on any DG computer, the company said.

Modular design, user-defined parameters and CAM's system generation program allow users to implement desired communications applications like message switchers, concentrators and front-end systems, the company added.

The CAM software is modular, allowing users with ALM-8, ALM-16 or SLM-2 multiplexers to add a DCU/50 controller without having to reprogram the application. Portions of CAM reside in the DCU/50 controller, reducing the main CPU overhead for both instruction execution and character handling in high throughput and large multiline configurations.

Standard and specialized protocol requirements can be met by CAM software. It includes both synchronous (bisync) and asynchronous protocols with an asynchronous terminal line procedure.

CAM provides for multidrop lines using poll and select sequences, allowing for system expansion. Synchronous and asynchronous protocols can be mixed in one system.

Specialized protocols for unique I/O devices can be generated through a low-level interface incorporating user-written line procedures, DG noted.

A Fortran IV or Fortran 5 interface to CAM is said to simplify programming of communications or other applications in high level languages.

The communications system generation program (Comgen) customizes CAM to users' own needs; users can interactively specify standard variables such as line types, character size, control characters, buffer size and time-out intervals. Users can further fit CAM to the application via parameter entries for message assembly/disassembly, code conversion and control character generation and detection.

A typical system including a DCU/50, an ALM-16 and one SLM-2 with software costs $8,940. First deliveries are scheduled next month from Route 9, 01772.

IBM 3604 Model 3

Increased Capacity Marks IBM Displays

WHITE PLAINS, N.Y. – IBM has introduced two versions of the 3604 bank terminal featuring increased character display capacities.

The models 3 and 4 of the IBM 3604 keyboard display terminal use neon-argon gas panels. The Model 3 can display 480 characters of information; the Model 4 has a 1,024-character capacity, offering users the largest character display available on an IBM gas panel terminal.

Four different keyboards, two numeric and two alphanumeric, are available with the 3604 models. Each contains programmable function keys that can be assigned specific meanings.

In addition, a magnetic stripe reader or a magnetic stripe encoder/reader may be mounted on top of the terminal. The reader captures information from a magnetic stripe on items such as a credit card, an identification card or a passbook.

When used in a remote location, such as a branch bank, the 3604s – part of the IBM 3600 finance communication system – may be equipped with an integrated modem for attachment over telephone lines to a 3601 finance communication controller.

Purchase prices for Model 3 of the 3604 keyboard display terminal range from $3,662 to $6,290, depending upon features selected. Model 4 prices range from $3,727 to $6,355.

First customer shipment of both models is scheduled to begin in the first quarter of 1976.

Datran Plans 12-City Expansion

VIENNA, Va. – The Data Transmission Co. (Datran) plans to add 12 more cities to its network by mid-1976.

When the expansion is completed, data communications users in 30 major metropolitan areas will have Datran service available.

The new cities to be added during the second half of 1975 are Atlanta, Denver, Hartford, Milwaukee and Phoenix. By mid-1976, Cincinnati, Indianapolis, Miami, Minneapolis, New Orleans, Portland and Seattle will be brought on-line.

Datran also said AT&T will provide 1.544 kbit/sec Data Under Voice facilities for inclusion in the Datran network. The first such link is expected to be in service early in 1976 between Chicago and the East Coast.

Datran is currently using 56 kbit/sec facilities provided by AT&T as part of its Dataphone Digital Service.

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Remember, these are seminars, not lectures, and you'll be learning by doing in a shirtsleeve atmosphere. Workshops are an important feature of the Seminars, and round table discussions and shop talk luncheons complement the seminar presentations. The workbooks and course materials are yours to keep, so you'll always have a handy reference to all you've learned.

We've selected leading experts from around the country to guide each of our Seminars. They are highly accomplished specialists in their fields, experienced in presenting their techniques to industry and management. If you're involved in one of the areas shown, you should attend the EDP Seminar Series this fall. What you learn will benefit your company, your installation, and you.

Data Communications Course #1010 – Practical Data Communications · Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

San Diego	**Plaza Int'l Hotel**	**Sept. 29-30**
New York	**St. Moritz**	**Oct. 13-14**
San Francisco	**Dunfey's Royal Coach**	**Oct. 20-21**
Dallas	**Hilton Inn**	**Nov. 10-11**
Miami	**Marriott Miami Beach**	**Nov. 17-18**

Data Communications Course #1020 – Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

Miami	**Holiday Inn Airport Lakes**	**Dec. 1-3**

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275

New York	**Summit Hotel**	**Oct. 22-24**
San Francisco	**Hyatt Regency San Francisco**	**Nov. 12-14**
Chicago	**Hyatt Regency O'Hare**	**Nov. 19-21**

How to Draft Effective Legal Agreements

This one-day seminar is a complete workshop for non-legal, technical people who may be called upon to draft legal agreements for their company. Also led by Roy Freed, this seminar covers a variety of formal agreements, their structure and the legal factors involved. You'll have all the basic skills necessary to write legal agreements, and you'll be able to spot items that really require the attention of lawyers.

Cost for the seminar, including luncheon and a complete workbook on the subject, is $135.

New York	**St. Moritz**	**Oct. 8**
Boston	**Sheraton**	**Oct. 15**

Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more.

Cost for the seminar, including course materials, continental breakfasts and luncheons is $350. Additional registrants from the same company qualify for a reduced rate of $300.

New York	**St. Moritz**	**Sept. 22-24**
Denver	**Denver Hilton**	**Dec. 1-3**

Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

New York	**Summit Hotel**	**Sept. 29-30**
Wash., D.C.	**Marriott at Wash. Int'l. Airport**	**Oct. 20-21**
Chicago	**Hyatt Regency O'Hare**	**Oct. 27-28**
San Francisco	**Dunfey's Royal Coach**	**Jan. 19-20**

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

New York	**St. Moritz**	**Oct. 6-7**
San Francisco	**Berkeley Marriott**	**Nov. 10-11**

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NOTE: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800.

Teleprinter Has Processor

SUNNYVALE, Calif. – Anderson Jacobson, Inc. (AJ) has introduced the AJ 830 keyboard printer terminal, which combines microprocessor control,

Terminal Transactions

electronic keyboard and "daisy-wheel" printing. It is described as the first AJ terminal to provide high speed, fine print quality and selectable code transmission.

Operating at 30 char./sec (45 char./sec optional), the printer provides up to five copies. The operator has a choice of interchangeable type fonts with upper and lower case, switch-selectable for either 10-pitch or 12-pitch printing. APL and Ascii keyboards are both available.

A 128-character buffer allows continuous data to be received without concern for delays during line feeds, tabs or carriage returns. Mode of operation is switch-selectable with choices of full- or half-duplex operation in Ascii, Ebcd or Correspondence codes.

High-resolution X-Y plotting is an optional feature and is available with Fortran software support.

The AJ 830 leases for $185/mo with an acoustic coupler. The terminal's purchase price is $4,750. It is available from 1065 Morse Ave. 94086.

MDS Reconfigures 2300

PARSIPPANY, N.J. – Mohawk Data Sciences Corp. (MDS) has reconfigured its 2300 system by combining local document processing and remote job entry (RJE) in one terminal.

The system can eliminate the requirement for separate keypunch or data-recording equipment. For CPU-dependent jobs which are best facilitated through RJE, the 2300 can act as the vehicle for centrally generated reports needed at remote sites, the company said.

A network of MDS 2300 terminals is said to handle the entire spectrum of a company's distributed activities: source data capture, remote processing and telecommunications.

The user can select from four possible 2300 configurations, depending on job requirements:

The basic terminal includes a 9-in. CRT, typewriter keyboard and can transmit data at speeds from 1,200- to 9,600 bit/sec. The terminal can be configured with a 3M Co. data cartridge drive called the 2330, which costs $1,000 or $25/mo on a one-year lease.

A software package allows existing 2300 users to upgrade to the enhanced RJE configuration at no charge and with no reprogramming. The basic terminal is $10,400 or $280/mo on a one-year lease, including maintenance. Delivery is 30 days from 1599 Littleton Road, 07054.

Q620 Generates Arabic Symbols

ANN ARBOR, Mich. – Ann Arbor Terminals, Inc. has introduced the Q260 controller which generates 64 Arabic characters, including numerals and upper and lower case, allowing the user to transcribe the Arabic language in an 80-character by 24-line display format.

The Q620 meets special requirements of the Arabic language. Design features allow characters which must connect to do so. Ascenders and descenders are provided, and a command function places a nuqta over the character when required.

Write operation is from right to left with characters entered and displayed on the bottom line of the screen. When the bottom line is filled, or carriage return and line feed commands are given, all the lines on the screen move up one, clearing the bottom line for entry.

The display is written from a five-level CCITT serial data source at 50 bit/sec. Data is refreshed from an internal memory at 50 Hz and remains stored and displayed until changed by the data source.

Character size is .09 in. by .22 in. nominal (on a 14-in. monitor) formed on an 8 by 8 dot matrix in an 8 by 10 dot field.

Price of the Q620 controller is $2,325 with delivery in 60 days from 6107 Jackson Road, 48103.

Four-Phase User Group Seeking Memberships

MORRISTOWN, N.J. – The Tri-State Four-Phase Users Group, which has been meeting since late last year, is opening up its membership rolls to other Four-Phase Systems, Inc. users.

The next meeting will be held on Wednesday, Sept. 17 at the Marriott Inn off Route 80 in Saddle Brook at 10:00 a.m.

Interested users may contact Phil Shapiro of Allied Chemical Corp., P.O. Box 1039R, Morristown, 07960, or Bill Burke of Johnson & Johnson, Route 202, Raritan, 08869.

At Datapoint we say

Good service is good business.

Here's what a few of our network customers say:

"Saab-Scania of America, Inc. (SSA) is a wholly-owned subsidiary of Saab-Scania AB of Sweden, and is the United States importer and distributor of Saab automobiles. The corporate offices and centralized EDP information processing are located in Orange, Connecticut. In addition, we have four regional offices. Each of these offices, as well as the home office, is equipped with Datapoint dispersed processing equipment. Datapoint field service has been consistently responsive to our needs and problems at these facilities. Their national Customer Service Center has proven to be a real plus, and we enjoy a consistently high uptime rate. SSA is now planning a considerable upgrade to our Datapoint installations, and we are confident that the field service organization will be able to support the upgraded system to our satisfaction."

MARTIN R. DOYLE
EDP Manager
SAAB-SCANIA OF AMERICA, INC.
Orange, Connecticut

"We have Datapoint Corporation equipment in many remote areas throughout the country. Several of these small towns are a hundred miles or more from the nearest service personnel. Despite these distances we receive prompt service and do not hesitate to add equipment in any location.

If a problem does arise, we have found that the maintenance personnel at Datapoint Corporation headquarters in San Antonio get involved in it immediately and effect a solution before a serious problem develops."

A. H. BLEGEN
Communications Services Manager
The Pillsbury Company
Minneapolis, Minnesota

"Having been one of Datapoint's early customers, we've watched their service organization grow and mature to a point where it is highly responsive and effective. Our Coast-to-Coast locations are all dispatched from the Central Call Center and a Datapoint Area Service Manager calls me if there is ever any unusual problem at a remote site.

The Datapoint Customer Support System allows me to inquire directly into the Call Center Data Base to determine the status of our network nationwide. In addition, Service History information is available by location which I use for management and analysis purposes.

Because of the equipment's reliability; we seldom need maintenance; however, when we do, Datapoint has the facilities and means to respond."

R. R. LATHAM
Project Manager
Celanese Coatings Company
Louisville, Kentucky

"Medical Computer Systems, Inc., services approximately 160 medical clinics and medical schools throughout the United States. Almost all of our clients are utilizing a Datapoint 2200 or 1100 with printer for input, transmitting this data via telephone lines to our mainframe computer in Dallas. Many of these locations are quite remote. Datapoint field service has increased in efficiency each year to the point that now I receive few, if any, calls from our clients with service problems. We at MCSI are pleased not only with the promptness of service but the technical expertise of each Datapoint representative."

JAMES GRESHAM
Director of Client Service
and Conversion
Medical Computer Systems, Inc.
Dallas, Texas

"We began using the Datapoint computer systems in our "BAT" radio and television applications in late 1972, selecting this equipment for two reasons: the architecture was right for our application, and Datapoint had already begun an ambitious field service program.

Since providing our first Datapoint system way back then, we have installed systems that now serve over 100 installations, in towns as small as Golden Meadow, Louisiana and as large as New York, New York, Sydney, Australia, and Toronto, Ontario. We have not only found that Datapoint service has met our original expectations, we have also discovered that the service provided Datapoint users has steadily improved, with more and more offices being added and with higher and higher skills on the part of technical representatives. In addition, the inauguration of your centralized WATS dispatching operation with special priorities for users encountering undue problems and 24 hour service availability has made a valuable asset even more valuable."

JOSEPH D. COONS
President
PSI Paperwork Systems Inc.
Bellingham, Washington

Wherever Datapoint equipment goes, our Customer Service representatives go – and they'll get there in a hurry, no matter how remote the location. That's the kind of back-up field service support network designers and managers have to have.

The nerve center of Datapoint Customer Service is our national Customer Service Center in San Antonio which provides 24-hour-a-day, 7-day-a-week attention to your field equipment service questions and needs over a national toll-free number (800) 531-5770 (in Texas it's (800) 292-5858.) Within an hour of receiving your call – and usually much more quickly – we guarantee a response from a local Datapoint Customer Service representative, no matter where your location. Datapoint's leadership in Dispersed Data Processing is a reality largely because of our highly competent customer service group. We really mean it when we say, "Good Service is Good Business."

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On-Line Credit Verification Speeds Sales Transactions

HOUSTON – On-line credit verification capability is speeding up sales transactions for more than 70,000 credit-card-holding sports enthusiasts here.

In addition to providing charge approvals for the credit-card holders, the NCR 280 terminals report transaction information to an on-line minicomputer. During a recent sale, this capability provided management with snap reports overnight, according to Alvin Lubetkin, president of Oshman's Sporting Goods, Inc.

"We were able to see what was moving, which products had to be further reduced and what stocks had to be moved from the warehouse or from store to store. This put the goods the public wanted where it wanted them – and at prices it was willing to pay," he commented.

The use of automation for compiling sales and financial information from data collected at the point of sale (POS) isn't a new venture for Oshman's. Over a decade ago, the chain recognized the value of gathering information at the point of sale for fast computer analysis.

All of the stores, 10 in number at that time, installed NCR registers designed for imprinting transaction information with the National Optical Font (NOF) on receipt tapes as a by-product of ringing up every sale. The store managers forwarded the computer-readable tapes to an NCR data center, where a variety of reports ranging from salespersons' productivity reports to detailed printouts of sales and inventory activities were prepared.

By the start of 1974, there were 44 Oshman's stores in existence with plans to open another three to four annually for the next several years. All stores were equipped with NCR Class 52 registers with NOF capabilities and by then, Oshman's had its own CPU for analyzing data.

Soon after electronic POS terminals became available, Oshman's management undertook an in-depth study. One of the questions it asked was whether it would be worth the investment necessary to

Terminal Transactions

upgrade to the electronic equipment since it already had an effective, working system.

In addition, a number of manufacturers were selling electronic terminals and management wanted to consider all of this equipment before deciding which was the best buy.

The NCR 280 terminals were selected on the basis of service and software as well as price and capability, Lubetkin said. Another consideration was that Oshman's was able to easily integrate the equipment into the existing system.

"We didn't want to change the system at all 44 stores at once," he said. "Instead, we decided to install 40 of the electronic terminals at 10 of our Houston stores. That allowed us to get some experience close to home. Also, we had our greatest need here, because almost all of our credit-card holders are in Texas."

Several major factors led to the decision to upgrade to electronic equipment, he said.

Instant credit verification was extremely attractive. Over 40% of the sales in the Houston area are charged to Oshman's accounts. Previously, sales personnel had a floor level which they could approve themselves. After that they had to call the credit office for charge approvals.

With the new system, they can get instant approval by keying the account number into the terminal.

The information is transmitted to an NCR 725 retail terminal support system at the company's DP center. The minicomputer searches a disk file, which contains key account information for each customer.

If everything is in order, an approval code appears on the terminal within four seconds and the transaction can be completed.

At that time, two things happen. The disk file is updated, which keeps people from exceeding their credit limit, Lubetkin explained. At the same time, the transaction is recorded on computer tape.

Biggest Limitation

"The biggest limitation is that the mainframe only updates the disk weekly," Lubetkin said, "so the most recent payments aren't in the minicomputer file. However, these can be verified quickly and easily by the credit office."

The electronic equipment also means that more current information can be provided to the mainframe computer for faster analysis, he pointed out.

The 10 stores already equipped with NCR 280 terminals are on-line to the minicomputer. Transactions at these stores are, in effect, real-time information. The NCR 725 can feed this data directly to the company's mainframe, he noted.

However, there is a less costly alternative, since the mainframe and minicomputer are at the same site. The information is collected on tape by the minicomputer. Periodically, the tape is removed and loaded on the larger computer.

In areas away from the main office, electronic terminals can feed information to a miniprocessor/terminal at one of the local stores, Lubetkin said. The data can be collected throughout the day and then transmitted for a few minutes each evening over leased telephone lines.

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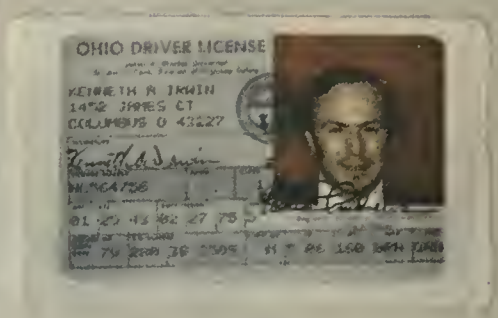

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While a deputy registrar uses the left side of the screen to enter live interview data on the specific nature of the application, the right side displays information on the driver from the BMV's mainframe computer. The two sets of data are then matched, the central file is appropriately updated, the application is processed, the fee is collected, an application number is entered, the expiration date is computed, and the system prints the license.

If there is some reason the applicant is ineligible, the system signals the fact to the deputy registrar . . . but in a way that provides full legal protection to the applicant's right to privacy.

This same system provides comprehensive push-button reports, which summarize the day's transactions of each deputy registrar: The type of licenses issued, the numbers, the related endorsements, the fees, and the disposition of each application. It relates the day's financial income to the transactions that produced it. It provides name and address reports on all licenses issued or refused.

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Sycor Printer Runs At 600 Line/Min

ANN ARBOR, Mich. – Sycor, Inc. has introduced a 600 line/min printer for use with its Model 340 and 350 intelligent terminals and its recently announced 440 clustered-terminal processing system.

The drum printing unit may be run by either cassette, flexible disk or magnetic tape drives, producing an original and up to five carbon copies on continuous, fan-folded, pin-fed forms from 3-1/2 in. to 9-1/2 in. wide.

The 600 line/min printer, including maintenance, is priced at $556/mo on a two-year lease and $650/mo on a one-year lease; the purchase price of the unit is $20,800. Delivery is expected in the fourth quarter from 100 Phoenix Drive, 48104.

Bits & Pieces

Destroyit Shreds Paper, Punch Cards and Microfilm

NEW YORK – The Super Destroyit paper shredder from Electric Wastebasket Corp. can swallow unburst computer printouts, punch cards, microfilm and business forms complete with paper clips and staples, according to the firm.

The unit has a 16-in. throat and a feed table with double-belted conveyor.

The device costs $3,500 from the firm at 145 W. 45th St., 10036.

Binder Creates Book-Like Volumes

MUNDELEIN, Ill. – The Cheshire 750 is a desktop binding machine that can bind computer printer output into book-like volumes.

The unit can accommodate sheets up to a 14-7/8-in. size (computer form dimension) at the binding edge. Bound volumes can be from 1/8-in. to 1-1/2-in. thick.

Cheshire, a Xerox subsidiary, is offering the 750 binder on a rental-only basis for $40/mo. The firm is at 408 Washington Blvd., 60060.

3M Co. Marketing Tape Cartridge

ST. PAUL, Minn. – The 3M Co. will market to users the tape cartridge it developed for the Control Data Corp. Mass Storage Facility.

Each cartridge contains 100 inches of 2.7-in.-wide tape, providing 144 tracks with an effective density of 6,250 bit/in.

The capacity per cartridge is 8M bytes or characters.

With Up to 64 Keystations

CMC Key-to-Disk Emphasizes Modularity

By Patrick Ward
Of the CW Staff

MARINA DEL REY, Calif. – The Computer Machinery Corp. (CMC) 1800 shared-processor data entry system is built for modular growth so the user can field-upgrade a system from medium-scale to top-of-the-line data entry capabilities, CMC said.

The 1800 replaces both CMC's midrange 16 model and the previous top-of-the-line 18. A midsize 1800 system with standard editing features costs considerably less than a similarly equipped 16 model, a spokeswoman said. However, 1800 and 18 models cost about the same, she added.

The CMC 1800's software and small increment modularity are said to allow the user to:

- Specify the mix of core memory and disk capacity needed to optimize the handling of his particular applications.
- Retune his system software at will to adapt to day-to-day operating priorities.
- Start with a few and add up to a total of 64 keystations, with supporting software to match each increment of growth.
- Pay for only the hardware and software he needs at each stage of growth.

The CMC 1800 incorporates all of the hardware and software features of the company's CMC 18. Among these features are:

- An optional "Kobol" language that lets a user program his own foreground edits for unique applications.
- An optional RPG-II language, that lets a user program his own "background" (after-keying) edits, data transfers and output reports on completed batches of data.

The CMC 1800 comes with 64K bytes of core memory, but this is expandable in 8K-byte increments to 160K bytes.

Minimum disk storage is 25,000 80-character records, but this is expandable in 25,000-record increments to 150,000 records. A second disk can bring this total to over 300,000 records.

System storage for 500 2,400-character record formats with 1,930 format levels is standard. This is expandable to 1,000 input and output formats with 3,860 levels.

A 10-keystation CMC 1800 system rents for $1,650/mo, including maintenance on a three-year lease and sells for $86,000.

Deliveries will being in the third quarter from the firm at 2500 Walnut Ave., 90291.

A CMC 1800 system can include a 115-, 300- or 600 line/min printer; 300- or 600 card/min readers; a 7- or 9-track 800 bit/in. or 9-track 1,600 bit/in. magnetic tape unit; and a 2314-equivalent disk. The system console is at center.

Guide to Vendors

DELRAN, N.J. – A *Directory of Suppliers* containing profiles of 780 companies that supply products and services to computer users is available from Datapro Research Corp.

Designed to help DP management choose suitably qualified vendors, the 160-page directory contains standardized entries describing each company's location, size, management, financial status, product line and sales and service organization.

The directory is reprinted from the July supplement to *Datapro 70* and costs $25 from the firm at 1805 Underwood Blvd., 08075.

System Probes Land and Oceans for Energy Sources

HOUSTON – Computers are a vital link in the geophysical exploration for oil, gas and other energy sources which goes on at some 600 land or sea sites throughout the world.

Computers can measure the velocity of sound waves in seismic operations, the most common technique used in the search.

The velocity measurements allow geologists and geophysicists to draw up seismic cross-sections of the earth which are typically between 20,000- and 40,000 feet deep and 10 miles long. Studying these acoustical time-distance graphs, the scientists can "see into" the materials of the various layers and look for anomalies caused by the presence of hydrocarbons.

The graphs allow maps to be made which show how the subsurface layers are constructed, thus indicating the most probable location of oil.

In the seismic explorations, sound waves are sent at 10- to 50 cycles per second into the earth's crust. A portion of the signals is reflected back to the surface by the deeply imbedded layers of rock.

Broadband geophones pick up the reflected waves, which are hard-wired to collecting points and recorded on magnetic tape for later processing.

By knowing the exact distance between the sound source and the geophones, the time when the return signals were detected and the curvature of the wave front from its arrival at two geophones, the computer can measure the velocity of the waves.

This, in turn, allows the depth to be precisely measured and tells the geologist some characteristics of the layers.

Geocom, Inc. of Houston is a geophysical exploration firm using computers this way.

Cecil Craft, president, explained that the firm's Univac 1106 can be "tuned" to certain reflected frequencies. Water beneath the earth, for instance, can cause reverberations of signals, which must be measured and subtracted out by a "deconvolution" technique.

The computer can also be programmed to predict and filter out multiple reflections. These are signals which bounce back and forth from shallow layers and interfere with the primary reflections.

Sometimes, too, hydrocarbons in the earth can be directly detected because they reflect sound waves very strongly. This is called the "bright spot" method.

Geocom uses a Univac array processor with the 1106 to handle the large amounts of data from the seismic shots. The firm also uses a Series 60 computer to convert the data from the various "traces," or samples, into a form which the 1106 can process efficiently.

During exploration, sampling takes place every 10 seconds from points 10- to 400 feet apart. At marine sites, data trace reflections are picked up by 49 geophones from 200- to 400 feet apart every four msec. For land sites, 24 and 48 geophone location sites are normal.

"Each seismic record from one sampling includes 96K 16- or 32-bit word samples, or 3M bits of information." Craft said. "This amounts to six 2,400-ft field tapes per hour. A typical marine station will send about 2,000 tapes a month, covering 2,000 search miles, for processing.

"If you have good information, 1 in 2 or 1 in 3 actual drillings for oil will be successful. The average is generally 1 in 9, with the odds of finding economical oil 1 in 45," Craft said.

"I would say digital and averaging techniques each increased our ability 2 to 1 and bright spot techniques another 2 to 1. Seismic exploration, aided by computers, is about four to eight times as good as it was in 1960," he said.

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Many Measures Exist to Protect Data Integrity . . .

By Robert J. Wilk
Special to Computerworld

Computers can perform a great deal of high-speed calculation, but they demand a highly desirable operating environment and power supply to do it.

For example, it is a physical fact that all electronic and electrical equipment emits and is susceptible to various levels of radiated and conducted electromagnetic energy.

Which circuits are susceptible to electromagnetic interference within the computers and to what degree, will vary between manufacturers.

Low-level circuits of the computer, the normal input of which is within the range of 50 millivolts to 2 volts peak to peak, do malfunction when subjected to moderate field intensity.

Sense amplifiers of the memory element malfunction at a field intensity in the region of 15 volts per meter; the tuning oscillator of the output section will malfunction near 40 volts per meter peak.

Data conversion receivers of the input section malfunction at 50 volts per meter peak. The flux amplifier of the output section fails at 100 volts per meter.

A few other circuits are even more susceptible; however, they represent a comparatively small number of the total computer circuits.

Real-World Situation

Now, how does this compare with the real-world situation? As an example, a large oil company recently located its data center on the 60th floor of an office building. The firm was plagued with a tremendous amount of operating errors. A consultant was called in who, fortunately, was aware of this type of problem.

The ambient field was measured within the computing room and found to be in excess of 1,000 volts per meter. When an electromagnetic spectrum analysis was performed in the area, several high-energy sources were located in the immediate vicinity.

There were three radio station towers operating in the AM/FM band, two microwave repeater stations and a high-energy transmitter used for radio telephone paging purposes.

Having identified the problem, a solid-shielded room was built to house the computer system, all power and signal lines were filtered and air conditioning ducts and other penetrations treated.

Naval shipyards and commercial airports are other areas where significant high-energy systems are employed.

Some False Notions

With regard to information recorded on magnetic media such as tape, disk, drums and so on, there are some false notions.

The concerns here are degradation of data from magnetic fields produced by electromagnets or permanent magnets.

Magnetic fields produced by AC-operated equipment such as floor waxers, electric motors, televisions and so on are of no danger to a magnetic tape if those appliances are in proper operating order.

In this context, periodic checks should be made on all the equipment brought into the data center, for the purpose of maintaining the area to be sure the integrity of the shielding material used on equipment is still in good order.

A gaussmeter does an effective job in this respect.

Can a visitor or workman walk through a computing center several feet away from the magnetic media carrying a concealed magnet and inflict any damage? Definitely not. Not from several feet away.

Distance is the greatest protection in these matters.

For example, the field strength measured on the direct axis between the pole faces of a horseshoe magnet is 800 Oersteds; at a distance of two in. from the magnet, the field strength drops to 100 Oersteds.

The amplitude of a recorded digital signal will begin to be affected at a field strength of 50 Oersted, and the computer will not recognize bit patterns on a tape exposed to a field of 700 Oersted at its surface.

The key point here is to recognize the threat to data integrity from magnetic sources and protect against them.

Commercially available magnetic detectors are sold which can detect magnets carried by personnel. These are useful if properly applied.

Grounding System

One of the most frequently overlooked areas in protecting the integrity of the computer is a properly designed ground system.

Variations in soil composition and moisture content as well as the layout pattern chosen for the particular grounding system will determine its final effectiveness.

Most computer manufacturers have definite requirements for grounding their equipment, whether it be analog, digital or specialized instrumentation.

Shield rooms, filters and electric power distribution equipment all require effective grounding and many countries have specific codes governing recommended grounding practices.

The type of system utilized, i.e., buried wire grid, single or multiple driven rods, star-burst pattern, etc. or simply connecting to the building structural steel, will be determined by your situation and requirements.

A good ground system will also enhance the protection afforded against lightning strokes. Stroke currents in excess of 200,000 amperes have been recorded and must be guided harmlessly to ground.

In this context, magnetic storage should be stored away from structural steel members of the building to prevent damage from the magnetic field introduced by the stroke current.

The ability of the incoming facility power supply to support a real-time, on-

(Continued on Page 23)

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. . . Individual System Requirements Determine Method

(Continued from Page 22)

line computer system must be of prime concern to achieve reliable, secure computer operation.

When the computer system does not receive the in-spec power which it requires, one possible solution to protect this large capital investment is the installation of an uninterruptible power source (UPS).

Generally speaking, all power disturbances can be placed into three categories:

- Transients which are dissipated within one half cycle.
- Interruptions which are dissipated within 30 cycles.
- Outages which are dissipated after 30 cycles.

The UPS systems commonly employed to protect or buffer the critical load from out-of-spec excursions in voltage and frequency fall into three categories: rotating systems, static systems and hybrid systems.

Why UPS?

Why is UPS needed and where is it applicable? Some of the factors that must be considered are:

- What has been your operating experience to date?
- Have you had complaints from the DP users within your organization?
- Have your systems controls been adequately handled?
- Have you had problems in data logging and load handling?
- What type of electrical disturbance is most prevalent in your particular location?
- Do you suffer most from transient interruptions, longer term interruptions or complete outages?
- What kind of records do you have readily available to substantiate the arguments for a UPS system.

Another important point is whether the disturbances are generated internally or externally. Is it a function of someone using a passenger elevator or control system in the building, someone throwing on a large motor load or is it, indeed, an external disturbance?

Now there is reasonably priced, highly sensitive instrumentation which has recently become available.

This can continuously monitor the computer power bus and record out-of-spec disturbances.

A strip chart recording can provide valuable documentation of interruptions. In addition to this, an alarm is sounded to enable operator intervention.

The operator can annotate the documentation that he has gotten from the recorder as to the time of occurrence and the circumstances; aside from this and possibly more important, he can flag the output of the computer and have it checked at a later time by the users or the programmer for errors.

Justifying UPS

How is UPS justified? Simply stated, it is based on what your particular system can economically tolerate. Certainly those with on-line, real-time systems have a more severe power requirement than batch processing operations that can be repeated if necessary.

In a multisystem configuration, the ability to break out your on-line, real-time systems and supply them from your essential bus, while your batch processors are supplied from your nonessential bus, can effect substantial savings in UPS.

Each computer system has a determinable cost associated with it based on lease or purchase cost, overhead and availability.

Once the problem area has been identified through the use of monitoring devices and procedures, the DP manager can present substantiated arguments to top management.

A great deal of engineering study goes into defining the requirements and specifications for a UPS system.

Factors such as load diversity, load frequency requirements (50, 60 or 400 hz), equipment mean time between failure (MTBF) and mean time to replace parts (MTTR), installation and cost data are a few.

Certain noncritical, on-line, real-time systems and some critical batch processing systems utilize a "fail-soft" approach to enhance their computer systems' security.

A fail-soft system will protect the computer's security systems and other critical loads from voltage transients and interruptions for as long as the batteries can carry the load.

When the computer operator is notified of a utility system failure which appears to be long-term, he initiates procedures to stop execution of programs at logical points, store all data and shut down in an orderly manner.

This is much more desirable than system "crashes" which are expensive and in some cases detrimental to the systems hardware.

To move from a fail-soft to a "fail-safe" system requires only the addition of backup gas-turbine generator sets, which I prefer over diesel units.

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The ABZ's of DBMS

A special supplement on Data Base Management Systems in the September 24th issue of Computerworld.

Data Base Management Systems are the subject of widespread interest in the DP community today, and they will be the subject of this special supplement in *Computerworld*. We'll be examining many aspects of Data Base Management in detail, with special emphasis on the applications that are best suited to Data Base Management. You'll see articles, tutorials and applications stories on topics like these:

- **When to use a Data Base Management System vs. another approach**
- **Applications best suited to Data Base Management**
- **Matching functional capabilities and system features to specific types of applications**
- **The advantages and disadvantages of using a network's Data Base Management System vs. an in-house system**
- **Danger Signals - things that can go wrong, and what to look out for in particular**
- **The benefits of Data Base Management vs. alternative approaches**
- **What's to be said for designing your own system, versus using a package**

If you have anything to do with Data Base Management, you should be reading this special supplement in the September 24th issue of *Computerworld*. And if you're a marketer in this field, your ad should be there. Closing date is September 4th. Contact your area *Computerworld* salesman for complete details. Or, call Judy Milford or Sara Steets at (617) 965-5800.

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SUPPLIES & SECURITY

August 27, 1975
A Computerworld Special Report

The DP manager choosing hardware or coping with the ins and outs of software development may regard data center supplies as a quiet area on the management front.

But supplies – paper, disks, tape and other products – can offer significant opportunities for savings that may go unnoticed.

The paper cost explosion brought some attention to this area. Users began to show greater interest in computer-output microfilm and CRTs instead of paper and to take another look at the number of report copies they really needed.

The purchase, storage and use of disks, tapes and other media deserve the same sort of attention. Careful maintenance can extend the life of such media and incidentally help the user avoid read/write problems.

Recycling offers another opportunity. Users can look around for paper firms that may want their "waste" paper or the users may decide to use lower cost recycled paper in their own operations. And as this special report shows, recycling can extend to ribbons and CPU heat as well.

Security and supplies intertwine in the need to protect supply reserves as well as tape and disk volumes.

As Robert Courtney of IBM recently stated, "Fire which destroys the supply of preprinted paper forms can seriously inconvenience [DP] operations and effectively cripple any function totally dependent on these forms. It may well take longer to replace a destroyed supply of customized forms than it does to replace the hardware facility."

There are an astonishing number of very different security measures competing for the DP manager's attention today.

Vendors describe esoteric minicomputer-driven systems that compare people's signatures or ponder their palm prints. Can personal brain wave readers be far in the future?

The user might wonder if the common sense of a guard might not be a better solution. But then the thought comes that just one slipup could bring very grim results.

But how grim would those results be? What does the shop have to lose and what is the probability of it being lost? The user has to weigh both factors and then decide how much protection is enough.

This sort of basic risk analysis thinking is the first step toward effective security protection. Then the user can start looking for the security measures that fit his particular needs and budget.

Of course, even the most carefully chosen security measures can be full of holes if their use becomes haphazard and lax.

And since the most heavily guarded center is useless if the building burns down or the power goes out, this special report takes a look at that sort of protection too.

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This special report was prepared under the direction of Patrick Ward, CW's assistant editor/systems.

Close Management Attention Needed

Security Practices Often Inconsistent, Incomplete

By Peter S. Browne
Special to Computerworld

Despite increased awareness by users and providers of DP services, the state of physical and data security as actually practiced is still relatively low.

Even among institutions that have a dedicated computer security function or institute computer security protection, audits reveal many instances of inconsistent, incomplete or inadequate protection.

Many problems can be related to insufficient management attention to the overall protection program.

Most organizations are victims of inconsistent security practices.

For example, physical security measures are observed during weekdays and other high user periods, but at 3 a.m. the doors are propped open.

Another problem is that of incomplete security practices. An organization may install a highly automated guard station with extensive alarms, TV cameras, etc., but no procedures or knowledge of what to do in case an alarm does occur.

Or, the organization may collect information from the computer system accounting data to reveal accesses to sensitive data, but nobody looks at the results or takes action as a result.

Also, many times security programs rely on single-stage protection measures, i.e., a single countermeasure is assumed to provide adequate protection, yet its reliability is known to be less than 100%.

Few Changes

For example, in most time-sharing systems, a log-on password is the key protective element in providing access control to data. However, users seldom change the passwords.

In addition, the passwords are trivially short or are easily associated with the individual. Also, passwords are carelessly protected. A perusal of an organization's daily trash will usually glean a number of current user identifications and passwords.

Yet, many other overlapping and redundant features are available to cover this particular vulnerability.

There are a number of steps that a security-conscious organization can take to mitigate these common deficiencies. To handle the inconsistency problem, management must first review the entire security program and look carefully at control points and interfaces of systems, procedures, personnel and physical movement.

Flow charting and decision table analyses are useful here. The goal is to review the protection measures in place at each of the major interfaces or control points in the process.

Adequacy and strength of the countermeasures should be compared and, where vulnerabilities exist, additional countermeasures should be proposed to eliminate the inconsistency.

One of the elements in the inconsistency review is to look at the countermeasure over time. Protection should be invoked 100% of the time it is needed. A more important activity is to ensure the cost of the countermeasure relates directly to the loss exposure of the asset being protected.

It is not a terribly cost-effective decision to implement a $100,000 security guard force to cover a maximum exposure of $10,000 per year. Unfortunately, all too often this "amulet" approach to security is the rule rather than the exception.

Because of a recent incident or problem, management will approve a protection expenditure without considering the threat or the probable loss.

The solution is to perform a thorough risk analysis and evaluate carefully the loss potential of the assets being protected, then measure the probability of occurrence of the various threats that could result in asset or productivity loss.

Incomplete Measures

How does one overcome the problem of incomplete security measures? Here also, a systematic review of each threat is necessary. Does a particular countermeasure cover all approach paths? For example, many physical security access control systems result in good protection over doors and windows, but forget a very large crawl space over the ceiling into the protected area.

Many software controls are developed to cover only the normal exit and entry points to a module, ignoring the potential for compromise through privileged access or when the system "crashes."

This audit or review process should also assure that all countermeasures are independently checked and their effectiveness verified. It is equally important to assure they are always invoked when required and where required.

The need for redundancy relates to a statistical principle that is operative as long as the protection methods are truly independent.

To explain, if a given countermeasure has a 10% failure rate over time, then it is important to have an additional protection for the same asset that is designed to provide protection during that 10% of the time that the countermeasure fails.

By a mix of compensating strategies, a degree of protection can be obtained that is far greater than protection gained by the single countermeasure. In fact, the probability of breach is the product of the unreliability factors of each of the protection strategies.

Privacy laws, demands of users for security and the need for prudent management dictate a rational approach to security. The three concerns of consistency, completeness and redundancy must be considered in any design strategy that attempts to provide protection for data assets.

Browne is manager of security operation at General Electric Co., Rockville, Md.

Shipbuilder Cuts Ribbon Costs With In-House Reinking Device

By Nancy French
Of the CW Staff

PASCAGOULA, Miss. – Ingalls Shipbuilding Co. here will save at least $16,000 this year by reinking its own ribbons.

While $16,000 is only a drop in this company's multimillion dollar DP bucket, it represents a 50% cut in its previous ribbon cost, according to Fred Wallet, DP group supervisor.

Clean, sharp printing is a must for Ingalls because much of its printing is engineering drawings, detailed workload tracking and other management reports that serve as camera-ready reports for the U.S. Navy, its biggest customer.

The company's two IBM 370/158s keep the center's seven IBM 3211 printers running 24 hours a day, and each one needs a ribbon change every 12 hours. "That's a lot of ribbons," Wallet pointed out.

Before getting the Burroughs XRL reinker, Ingalls' DP department bought more than 1,800 ribbons a year, used them once and discarded them. Even ordering by the gross, the cost per ribbon never dropped below $15.70 – for a total annual expenditure of nearly $30,000.

As inflation hit and costs veered farther and farther from budget estimates, Wallet, like many other managers, began looking for ways to shave costs. Ribbons turned out to be an easy way, he said, and about eight months ago the Burroughs unit was installed in the computer room.

Aside from a few early problems, Wallet said he has been happy with the decision.

Right now the firm is reinking about 150 ribbons a month at an approximate cost of $600. "We haven't bought a new ribbon in four months," Wallet said, adding that he gets from three to five reinks per ribbon.

Easy to Use

"To reink a ribbon, you simply thread it on the unit just as though you were putting it on a 3211 printer," he said. "Then you close the latch, hit the start button and in five minutes the ribbon is completely reinked."

Reinking doesn't add much to the center's workload either, Wallet said. The lead operator on each shift is responsible for reinking and dating all the ribbons he removes. After reinking, the ribbons are replaced in their boxes and color-coded to show how many times they have been reinked.

After the third reinking, the ribbons are checked for wear; if they're still good, they are reinked again. If not, they are discarded.

The ribbons are stored at least 24 hours before being reused, Wallet said. "We used them without waiting 24 hours once when we were in a bind," Wallet said, "but aside from some minor smudging, it caused no real problem."

There was some ink buildup on the printer train, which caused the train to bind a bit when the ink dried, but IBM customer engineers came in and cleaned that off with no problem, he said.

The only serious problem Ingalls ever had with the unit was uneven inking, Wallet said.

"We found we were putting in the ink wrong. Once that was corrected, the unit worked fine," he said.

Best Reinking Option

The 3-ft by 5-ft by 15-in. tabletop unit was the best of the reinking options open

(Continued on Page S/3)

Risk Analysis Requires Time, Planning, Top-Level Interest

By Robert V. Jacobson
And Peter S. Browne
Special to Computerworld

Guarding against unacceptable losses should be the goal of any computer security program.

But what are unacceptable losses? How do they occur? What countermeasures are available to reduce risk? Are they cost-effective?

These are the kinds of questions risk analysis aims to answer. Unfortunately, most organizations have not performed a risk analysis for their DP functions.

The apparent reason is it takes a great deal of time and effort to systematically identify, quantify and evaluate DP risks. But it has to be done if meaningful computer security decisions are to be made.

Getting Started

Starting a DP risk management program brings up the question: "Who should get the ball rolling?" First, create the position of DP risk manager and assign it to someone on a full-time basis, at least for the duration of the risk analysis project.

It will take months to complete a comprehensive study – but it's worth it if done properly. Anything less than a full-time, coordinated effort will dilute the results.

Even though a great deal of the detail work will be done by the departments using DP services, the DP risk manager must oversee the planning, organizing, coordinating, persuading, summarizing and the presentation of the risk analysis. This will consume at least three to nine man-months.

The DP risk manager's role should be viewed as a staff function servicing line management. Usually, the newly appointed DP risk manager will not have heavy management experience. Possibly, he might be an experienced DP project leader.

It is important that the DP risk manager report to an individual at a high level within the organization – preferably a vice-president.

The DP risk manager must effectively interact with all levels inside and outside of DP. He must be in a position to communicate upward and downward with equal credibility.

His task is vital, and he must command respect. His influence will be viewed by many as a measure of the importance senior management places on his responsibilities.

Developing the Project Plan

The first step is to develop and nurture sponsors for the risk management approach within the organization. The more people who are committed to the success of the project, the easier it will be to implement corrective measures later on.

In any case, a project plan to initiate the risk analysis project must be developed and presented. The project plan should describe the scope of the project, the organizations affected and a plan of action.

To define the scope of the project and the resources required to perform the risk analysisk there must be ample expertise available. This can be acquired via authoritative reports, articles and presentations, attendance at specialized seminars, discussions with others who have attempted similar work or by using the services of an outside consultant.

Once the proposal has been presented and a "go ahead" received for a full-scale risk analysis study, there are several preliminary tasks the DP risk manager should complete. In certain instances, these tasks will already have been performed in preparing for the initial presentation.

First, identify persons within the organization who have a vested interest in the risk analysis. These include departments and managers who are responsible for major computer applications. Include also: building maintenance and security staff, the insurance risk manager, the controller, the audit staff and the legal counsel.

Next, analyze the DP function. This would include financial data relative to the entire organization and, specifically, the costs of DP hardware, facilities, people, applications and supplies.

Then, survey the major DP applications.

(Continued on Page S/5)

Loss Potential, Risk Should Decide Security Budget

By Eugene D. Finneran
Special to Computerworld

What percentage of your annual budget should go toward the security of your physical plant, processors, memory banks, tape libraries and storage facilities?

It is impossible to establish or arbitrarily set a blanket amount. But there are criteria on which to base a decision. Each company will have different degrees of need for a security program that is compatible with its individual characteristics.

Before you can begin to compute costs, you must first estimate what your company could lose. Fire or burglars could hit the DP center. Saboteurs could erase your memory banks. Vandals could ruin your tape libraries.

An employee could disseminate information incorrectly or to the wrong people; you could suffer the loss of proprietary data to an industrial spy; a power failure could shut down DP operations for a prohibitively long time.

If you were operating an ordinary office, rather than a DP facility, you could compute the loss of your plant at $5/sq ft to $10/sq ft.

However, it is not unusual for a computer room to be valued at $500/sq ft to $2,000/sq ft.

Once your loss potential is established, you must proceed to an analysis of specific threats to the safety of your physical plant and the information contained there.

Use of this data, combined with common sense, will enable the DP security planner to estimate the probable occurrence for each type of threat.

Annual Loss Expectancy

The next step in your analysis is to determine an annual loss expectancy by combining the value of the potential loss with the probability of loss.

The purpose is to identify which of the possible threats would result in the greatest monetary losses, thus developing a guideline to determine what amount of money should be spent to reasonably protect against each specific threat.

In simple terms, a relationship must be established between the cost of protection and the cost of the loss if the protection were not provided.

Where it is found there is or could be a significant loss potential, this potential should be multiplied by the possibility of the threat occurring to obtain an estimate of annual loss.

Using a loss of power as an example, you would need to estimate how long that would shut down your operation and what the cost would be.

Losses resulting from fires, floods and so forth would have to be determined by estimating several varying degrees of severity. A number of loss types should be considered, for instance, minor losses in a portion of the facility, major losses in the facility and total-loss situations.

It will be much more difficult to project losses from human acts since there is no sure method to use to estimate the probabilities of their occurring. The user can research the frequency of such losses in like or similar facilities, keeping in mind the protective devices and/or measures in use in each facility.

Once the planner has identified the threats toward which he will apply protective measures, he must then determine the type and degree of the measures he needs to implement.

Protective measures range from moving the DP facility to a less vulnerable area or moving a threat-producing operation away from it, to improving procedures which will minimize or eliminate the threat to installing detection devices to give early indications of a threatening condition.

The most economical measures, the easiest to implement and, consequently, the ones most normally used, are those which fall into the categories of providing barriers or early detection and improving procedures.

Dealing with the latter category first, particular emphasis should be placed on more thorough preemployment screening to include employment history, credit information and reputation within the communities where the prospective employee has resided.

Add to this more stringent standards for programming and for software testing and you will have begun to minimize threats from inside sources.

Through the installation of smoke detector, heat sensors, fire alarm or intrusion alarm systems, you can expect early detection and alarm that will bring a timely response.

Protection from natural disasters can best be obtained by constructing the DP facility to withstand those natural hazards which are native to the area in which it is located.

The threat of power failures is undoubtedly the easiest to prevent. It may only require installation of a reliable backup generator.

When initiating these protective measures, consideration must go to restricting entry to the DP facility to authorized persons.

Finneran is with the Security Services Group of Guardsmark, Inc.

User Trims Spending By Reinking Ribbons

(Continued from Page S/2)

to the firm, Wallet said.

"We could have sent the ribbons to a number of places that reink and mail them back, but there were too many hassles involved sending them back and forth, and some companies were charging as much as $11 per ribbon for service," he said.

"It's a lot easier to control the reinking ourselves right here. If a ribbon isn't reinked properly, we just hit the button and do it over," he explained.

The firm made the decision to rent the reinker after a cost study showed the unit would save about $10,000 in ribbon costs, based on one reinking per ribbon, he explained.

"We estimated that our costs would be $600 for rental plus $1,425 for ink. Reinking once meant we would need about 960 ribbons at a cost of $14,810, and the reinking charge would be about $2,850," Wallet said.

"But actual savings have been much greater since we're reinking three or more times, and the ink is going much further than I had estimated," he noted.

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A Comedy of Errors

Charlie Had Hardware; Now if He Were Only Organized

By B.W. Rollinson,
Special to Computerworld

For months, Charlie had been trying to get me to visit his company's computer operation.

Undoubtedly, he wanted to impress me with all the latest equipment and systems he'd installed almost as rapidly as new technology had been announced. Charlie regales everybody with the power, speed and capacity of his computer and its peripherals.

So I finally gave in last week when a friend canceled a tennis date at the last minute, leaving me to face nothing but work in a sunny, summer afternoon. Driving over to Charlie's, I remembered some of his boasts, and by the time I walked in I was ready to be impressed.

Charlie greeted me like an honored guest. "You're gonna see one of the most beautiful operations this side of the Mayo Clinic," he began.

As we walked into the computer room, I tripped and fell over a pile of printout binders, just barely avoiding a stack of disk packs. "What was that?" I asked.

"Sorry. I should have warned you – we keep complete documentation on every program we've ever used. That binder you have your foot on, for example, represents corporate payroll."

"How come it's all over the floor?" I asked.

"Well," said Charlie, "it was all in a nice neat stack until you redistributed it." Charlie laughed and started picking up the avalanche.

"Anyway," he continued, "you missed the disk packs."

"I'm glad of that," I offered. "But wouldn't it be a lot easier to get a couple of storage cabinets so you could organize all this media when it's not being processed?"

"Naw," he answered. "We use the media you see here all the time. And when we want it, we don't have to go looking in some cabinet somewhere. This way it's right here when and where we need it."

He beckoned me further into the computer room. "Carefully, now, follow me over to the new Magi-Term. I want to show you how fast data output can really be."

"Great," I said, "where is it?"

"Right over there by that stack of magnetic tapes," he said, leading the way. "This little baby is so fast, it takes two girls just to carry the printout over to where those four decollate it."

"Girls?"

"OK – people. I'm no chauvinist," he said. "But you can't expect a senior operator to do that."

"Ever think about getting a forms decollator?"

"That's what those girls are," Charlie pushed on. "Now let me show you something fantastic."

"I think I'm ready."

"OK," he alerted his operator, "Load Demofant II."

"Roger," said the operator. "I've got the tape here someplace."

"C'mon, c'mon," urged Charlie. "It's in the white cartridge with the red label. It was right there behind the data phone last Friday."

We waited as the operator rummaged through several tapes behind the data phone. "Wouldn't it be easier," I asked, "if you had a coded tape storage system so you could find the tape you want faster?"

"A waste of money," Charlie answered. "People come in here all the time trying to sell me stuff. I tell them I use my money to buy computing power, not computer furniture."

"Wait a minute," said the operator. "I think it's in your desk, Charlie. You said you wanted to put it someplace where it wouldn't get lost again."

"Oh yeah," admitted Charlie. "Well, let's just show him the Demofant I demonstration. I think Mabel was going to store it on one of the new disk packs and it should be easier to find."

"They're over there on the coffee wagon, I think," said the operator.

"Coffee wagon?"

"We have to keep the disk packs down the hall in the storeroom," Charlie explained. "Bulky, y'know. And they're too cumbersome to move around. After the doughnuts and Danish are sold, there's always room on the coffee wagon for a couple of disk packs."

No Sharing This Time

"Nope," said the coffee person. "The Danish got returned because they were stale on Monday, so we couldn't share the cart with DP."

Charlie was starting to look a little desperate. "OK, Margie, didn't you put the Demofant I demo onto digital cassette backup last week?"

"Sorry, Charlie," she answered, "I did, but they got mixed up with my Ella Fitzgerald audio cassettes, and they're in the glove compartment of my TR-3."

"Well," said Charlie, "take my word for it. The hardware and software you see here is just short of fantastic."

I leaned against an operator's input device and sent a teetering pile of diskettes to the floor. "Oops," I said.

"You're a real disaster in a computer operation," he said, losing his sense of humor. "It's going to take me a week to get everything organized again."

"If you really want to do that," I said, "why don't you put your money where you media isn't – into the storage and handling equipment necessary to properly organize your computer operation. Remember, there are computer accessory specialists you can get help from, just like there are computer hardware and software specialists."

"Who needs it?"

"Look at it like this, Charlie. It's probably the only way you and your staff can ever hope to keep pace with the input and output demands you've technically geared yourself up for."

"Maybe," he sighed. "But with all this stuff around here, I don't think we have room for anything else. Maybe we just need more floor space . . ."

Rollinson is with Tab Products Co.

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Floppy Drive Vendors Say Recommended Disks Best

By Molly Upton
Of the CW Staff

When a user selects diskettes for his floppy disk drive, the safest path is to choose those recommended by the drive supplier, interviews with suppliers indicated.

Although some suppliers tell the user to buy whatever diskettes he wants, most vendors surveyed recommended specific brands of diskettes.

Several commented that users who are accustomed to interchanging different suppliers' cassettes may be in for an unpleasant surprise if they adopt that practice with floppies.

To the user selecting diskettes, there is little for him to judge except price, one vendor said.

But, in actuality, there are a host of different characteristics of the media and its interaction with the drive that can affect the media's performance.

One key is to match the diskette to the individual drive. Although much of the industry is moving to the ceramic head, pioneered by IBM, the makeup of the head itself is not such a critical factor in durability as the media with which it is in contact, most vendors agreed.

Controller Design Critical

The design of the controller is more critical than the drive or the media, said Phil Goodman, vice-president of marketing at Digital Computer Controls.

"It's tricky to learn how to work with it, but then you can make it fly," he said. "Many games can be played to avoid a multitude of sins," Goodman added.

Prime Computer, Inc., which has been shipping systems with floppy drives for about a year and a half, has had users reporting strange problems which stemmed from using uninitialized diskettes, said Bill Farr, lead engineer for peripherals.

Although Prime recommends the use of IBM diskettes and two others, he said often users will select others not suggested.

One maker's floppy doesn't conform to the IBM specifications for initialization, which causes some consternation in testing, he said.

Ball Computer Products tells its customers to buy whatever diskettes they want, said Jim Winkel, area manager. Ball buys drive mechanisms from Pertec Corp. and Shugart Associates and provides interfaces.

Normally, Ball supplies IBM diskettes with the system, but its customers have had good luck using different types, he said.

Advanced Electronics Design (AED) takes still another approach, certifying lots of diskettes from three makers and recommending the customer buy these.

Innovex Corp. likes to sell privately labeled diskettes, said Kurt Dexter, national sales manager. The firm has found four or five suppliers' products acceptable, he added.

At Sycor, Inc., Ray Kavlick, vice-president of engineering, said that firm qualifies its diskette suppliers and noted the list extends to BASF Systems, Inc. and IBM currently, although it is working with others.

IBM was generally conceded to make diskettes of the most consistently high quality. Several disk makers said they specify IBM diskettes for technical evaluations and alignment tasks.

Other media suppliers are improving their products, the vendors said, although one said IBM's diskettes are about 30% ahead of the others in terms of quality.

Several cited the problem of lack of quality control from batch to batch of diskettes among media suppliers.

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Risk Analysis Needs Top-Level Interest

(Continued from Page S/2)

Identify them and determine how critical they are to the productivity of the organization: the assets they control; the daily, weekly and monthly run times; the mode of operation, i.e., batch, on-line, real-time, etc. Determine the ease of file reconstruction, the sensitivity of files to disclosure and the maximum processing delay duration that can be viewed as "no cost." With the above information, preliminary conclusions can be drawn regarding the applications of greatest loss potential.

For each critical application, analyze individual programs and data files that support the application. This information will be useful in determing the degree of refinement to be used in assessing risk.

Expanding and refining the plan of action is the next step. This final preliminary step should include details of all major activities, events and resources required to perform the risk analysis.

The key goals of the risk analysis project are to stimulate top management interest and involvement and to eventually acquire monetary and organizational support for a long-term DP security program.

Top-management suppport is absolutely essential. Without the "top-down" influence, the program cannot be effective.

If, on the other hand, management feels privileged to ignore newly implemented controls (e.g., by establishing a selective personnel access control system), the expected benefits will not materialize.

A Cost Reducer

A practical way for the DP risk manager to generate interest in his project is to show how improved security can save corporate dollars. The bulk of an organization's losses usually result from small losses repeated many times (e.g., entry errors).

To the extent that countermeasures reduce these small but pervasive costs, the benefit is directly measurable.

When the DP risk manager deals with more costly but less frequent threats (e.g., a major fire), the same principle is true, but the cost saving is much more difficult to substantiate.

The objective, of course, is that the expenditure of resources to reduce or eliminate risk is significantly less than the expected losses.

Jacobson is assistant vice-president at Chemical Bank in New York City. Browne is manager of security operations at General Electric Information Services' Business Division. This article is an excerpt from the Computer Security Risk Management Handbook *which will be published this fall by the Computer Security Institute.*

New Technology Making Physical Security Easier

By Belden Menkus
Special to Computerworld

Recent concern with data privacy and software security problems should not be allowed to obscure the continuing vulnerability of many centers to a variety of physical perils.

Technological advances, however, are making it easier to protect the computer center against these threats.

Substitution of coded-sequence button locking devices for conventional key locks is an improvement in access control. So also is the use of magnetic-striped or similar-coded plastic-card-activated door locks.

However, neither of these control techniques positively verifies the identity of an authorized entrant.

Two devices appear to have resolved that problem. One is the Identimation hand geometry recognition system. It traces the outline of an individual's outstretched hand and compares it with previously stored data on authorized entrants.

The other is the Fingerscan identification system developed by Calspan Technology Products. Fingerscan uses the basic technology being considered for digitizing of the Federal Bureau of Investigation fingerprint files.

Without requiring an intermediate ink or powder image, the system scans an individual's fingerprint, automatically digitizes its physical characteristics, matches them against a previously stored digital record and determines if the person should be admitted.

Performance reliability of 99.9% is claimed for Fingerscan. The system can support up to 15 wall-mounted identification terminals.

Attempts to compromise the system trigger an audible alarm and can notify a remote guard or monitor station. And, identification data can be encrypted automatically when transmitted between terminals and the system controller.

Time from terminal activation to system response is claimed to be two seconds. Data on entry and exit of particular persons may be logged routinely by the system.

Identimation and Fingerscan appear to have virtually eliminated such common access control system vulnerabilities as password compromise, identification card or key theft and passback.

While there remain strong reservations about the use of water sprinkler fire extinguishing systems in a data center, they offer far better fire protection than no sprinklers at all. A remarkably high number of modern, high-rise office buildings have no fire extinguishing system of any sort.

Where local fire codes specify sprinkler installation in the computer operations area, consider use of the Grinell Aquamatic, the on-off sprinkler head.

Once activated, it avoids the continuous water flow that is characteristic of conventional sprinkler heads. The Aquamatic head shuts off when the air temperature drops below the activation level; it reopens if the temperature later rises again above that level.

Carbon dioxide or Halon 1301 extinguishing systems linked to products of combustion detectors are preferable to water discharge devices. The detectors, mounted at key points on the data center ceiling, identify incipient fires by reacting to accumulating smoke or combustion products invisible to the human eye.

Both extinguishing systems suppress fires. Carbon dioxide smothers the fire by withholding the flow of air to it. Halon 1301 halts the oxidation process that supports combustion. Both are clean and nonconductive.

Unfortunately, each has a drawback. In some cases, carbon dioxide can endanger the lives of data center personnel. And Halon 1301 is expensive to use.

Emergency Power Sources

Federal Occupational Safety and Health Administration (OSHA) regulations require that sufficient reserve power be provided for at least 90 minutes of sustained lighting during an emergency.

And the realities of maintaining sensitive real-time or remote terminal data entry operations in the face of power supply fluctuations necessitate even larger emergency power reserves.

Several seconds to several minutes are required for activation of conventional diesel motor emergency power generators. Successful, sustained DP operations require a faster emergency response.

The uninterruptible power source (UPS) was developed to

(Continued on Page S/8)

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Merrill, Lynch Guards On-Line Net With UPS System

By Ted Vande Woude
Special to Computerworld

Imagine the difficulties a power shutdown could bring to a massive on-line DP operation.

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Planning the system required the integration of so many other elements that it is indeed a most unique complex requiring a total maintenance staff of its own.

An Uninterruptible Power Source (UPS) regulates the uneven flow of current from the commercial supplier. If this flow of electricity were to fluctuate more than 8%, the computers could not function properly.

The importance of our UPS system is reflected in the fact that 40% of the construction budget for our current installation went toward power, special power and power insurance.

Experience With UPS

Our experience with a UPS system dates back to 1968, when we had two 125-KVA converters which regulated the commercially supplied power which ran our IBM 360 systems.

Our present location, which is six times larger than the previous one, is also designed for future expansion should the situation demand it.

At present, we are an IBM 370-oriented shop with three 165s and three 155s. We are reputed to be one of the country's largest single-floor installations.

To ensure that we have adequate commercial power, we have obtained from Consolidated Edison three main services with a total capacity of more than 8,000 KVA.

These services are routed through 24 3-1/2-in. conduits to the main distribution board. The distribution board contains two independent sources of power, one being commercial power supplied by Edison and the other coming from our in-house emergency source generated by turbines.

By utilizing transfer switches we have the option of employing either the commercially supplied power or that which is generated by our own turbines.

Thus, in the event of a complete blackout as we once experienced on the east coast, we can generate our own power and run indefinitely.

Our distribution board contains a 4,000-Amp automatic transfer switch that is the main distribution for the critical load.

Should there be a power reduction of 8% or greater (we have experienced such reductions this year) for a period of three seconds, automatically our backup power takes over without any noticeable loss of continuity.

Our five installed 800-kilowatt turbine generators (with provisions made for an additional generator to be installed should the need arise), create an output of 4,000 kilowatts, providing more than adequate power to run our entire computer installation, including the lighting, air conditioning, elevators and even our electronic security system.

Other than emergency-generating capacity, our UPS system also stabilizes and regulates the commercially supplied power entering our computer systems.

The UPS currently includes six 250-KVA power converters, or a total of 1,250 KVA (one redundant converter).

In anticipation of future possible expansion, we have provided space and all other necessary material to add four more power converters. This will bring our total capability to 2,000 KVA (plus one redundant) and one off-line converter.

A total of 1,440 batteries (single cell 1.39 volts) provide the necessary instantaneous power in the event of any failure.

The batteries have the measured capability to carry the critical load for 15 minutes. During this time, our turbine generator will switch in automatically within three minutes, allowing for transfer and start-up time.

Power for the 400 HZ Hertz (cycles) IBM equipment is supplied by four 200-KVA motor generators running in parallel. Once again, provisions have been made in our systems design for possible future growth by providing facilities for

(Continued on Page S/9)

Technology Provides DP Site Protection

(Continued from Page S/6)

provide that response.

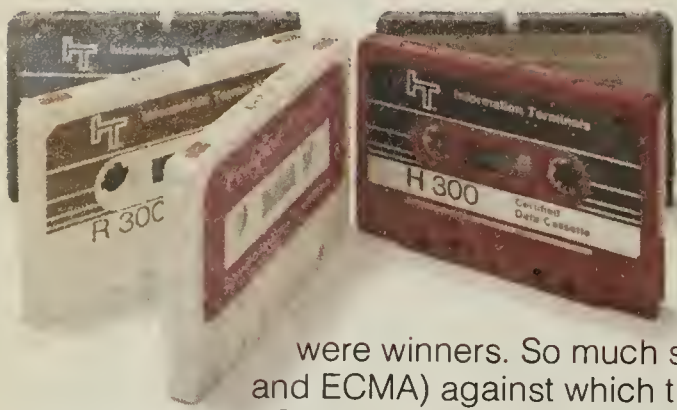
In addition to providing instantaneous reserve power, when coupled with a voltage regulator, the UPS isolates the mainframe and system peripherals from random power supply fluctuations.

Some four dozen vendors offer UPS systems. Two approaches govern the use of these units. Some systems are designed to provide power until a conventional motor power generator can be activated.

Others are larger and are intended to provide sufficient power to maintain DP operations until it is expected that the regular power supply will be restored or until a graceful shutdown of operations can be successfully completed.

Menkus is a management consultant based in Bergenfield, N.J. A member of the advisory board of the Computer Security Institute, he is editor of its Computer Security *letter.*

How we got ahead of the pack in data storage media.



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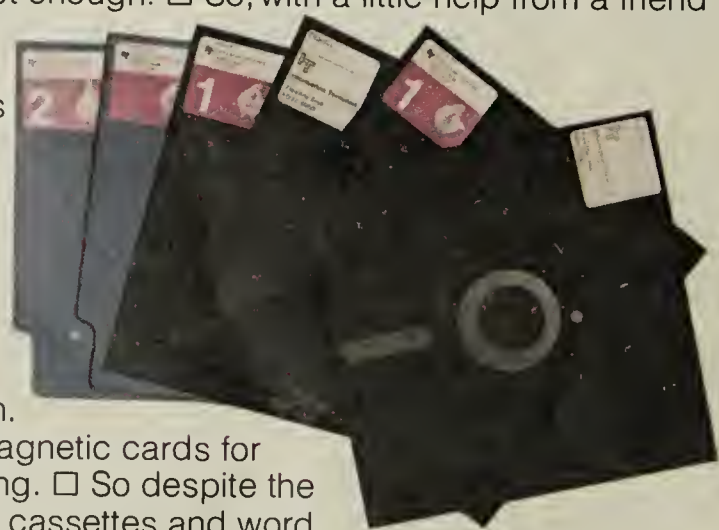

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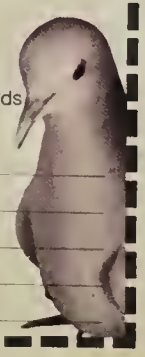

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Security Personnel Need Varied Skills

By Robert J. Wilk
Special to Computerworld

To have effective operational data security in any organization, the data security group must work with the operation of that organization.

Data security cannot be imposed like a great millstone about the neck of the operations manager. But how does an organization achieve this objective?

A technical security responsibility must be set up that is capable of performing risk/value analysis in all operational areas of the company. To do this, the security group will have to work with the operations personnel so they have an understanding of the production flow in the organization; of the way jobs are programmed, assembled, initiated, processed, distributed and so on.

Technical security personnel will have to be able to relate to architects, planners and facilities engineers, whenever the time comes to locate a new site and plan a new facility.

They have got to be involved from the onset to assure that adequate measures have been taken at various steps along the way.

Technical security people must have a working knowledge of not only the strengths and weaknesses of the computer systems' architecture, but also the teleprocessing networks that connect them.

This knowledge can come only with training, proper interfacing with the manufacturers of systems hardware and a true understanding of each other's problems.

The technical security function then, must not only relate to the operations personnel within your organization, but it must relate to the manufacturing personnel outside the organization.

In addition to this, the group must be able to relate to security personnel and they must certainly be able to communicate to management the scope of the problem and their recommendations for action.

Where does one find this kind of person – these multifaceted people who must be able to shift interdisciplinary gears so well?

One thing an organization can do is to train people from within the organization who already have an understanding of the technical aspects of security and operations or management background.

In those disciplines where they are weak, a firm can train them to achieve the required strengths. Many companies have training courses set up within their own organizations to accomplish this, and there are courses available outside.

As an adjunct faculty member of the Graduate School at the Polytechnic Institute of New York, I have initiated a three-credit, 16-week course on "Operational Data Security and Fraud Prevention." The course is presented on a masters degree level in the Management Department, but is open to nondegree students possessing the necessary prerequisites. It is hoped other universities across the country will eventually follow suit.

Many universities presently offer courses in computer science and DP, and an intensive course in data security from an engineering/management viewpoint could easily augment these programs and have great practical utility.

Wilk is president of Operational Data Security Corp. in Dix Hills, N.Y.

UPS Protects Merrill, Lynch Net

(Continued from Page S/8)

an additional motor generator.

Power for all peripheral equipment is distributed from power panels located on columns within the computer room.

From the panels, power is brought to the equipment via conduit. We employ 10-foot flexible tails and in-line connectors to provide us with flexibility in connecting to the various computer equipment.

This is done too, to anticipate future growth.

Maintenance on the static converters and motor generators is divided into five inspection periods: daily, weekly, quarterly, semiannually and yearly.

Since our DP operation is virtually a seven-day, 24-hour operation, we have to make every effort to provide adequate maintenance time.

Daily inspection and recording is made of readings of input/output voltage, amperage, converter load sharing and frequency. Daily inspection is made of each logic power supply; this includes a thorough visual scrutiny of each converter cabinet and motor generator.

Weekly, we check items such as the level of electrolyte in each battery, fan belts, filters and lubrication oil in the motor generators sump.

Quarterly, a shutdown system test is performed in coordination and conjunction with the turbine generators. Let me remind you our generators are tested daily.

This is performed to verify the automatic bypass circuitry, battery operation of the UPS, recharging rate of battery chargers, manual transfer circuit, systems functions and alarms.

Inspection of these UPS converters, wires and bus bars is tightened. A check of convertors logic with test cart is made and, if required, we tune up the converter.

The other converter will be subjected to the same rigid inspection on the following quarterly inspection.

Semiannually, we check the switch gear. All cabling connectors, input power feeder, output feeds and circuit breakers are thoroughly examined.

All internal power and control connectors are checked, and the logic section (control panel) also gets cleaned and looked over.

The yearly inspection resembles the semiannual inspection, but is more extensive. It is at this time we clean and retorque all battery connections plus check the specific gravity of each cell.

To make certain we possess sufficient replacement parts, we have instituted an automatic inventory system.

The aforementioned, somewhat brief discussion of our UPS is only one of the many large systems in operation at our installation. We have incorporated in our installation items such as:

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- Metal-detection system at computer room entrance.
- Door alarm system on all exits leading out of computer room.
- Dry pipe sprinkler system.
- Two 100-ton chillers for the IBM 370/165.

Vande Woude is vice-president of computer services at Merrill, Lynch, Pierce, Fenner & Smith in New York.

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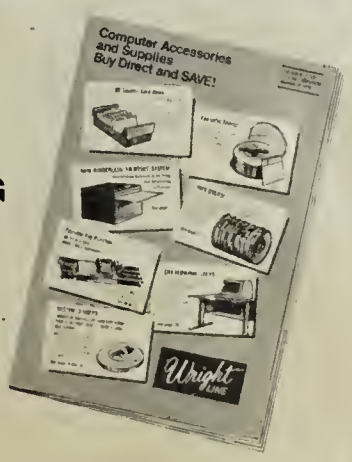

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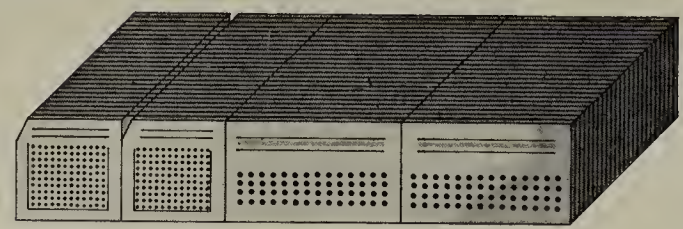

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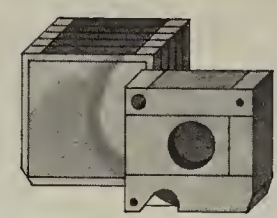

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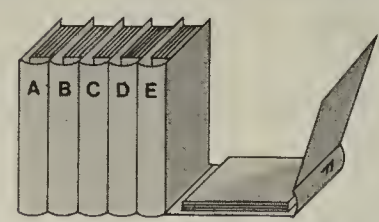

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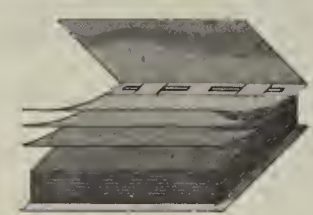

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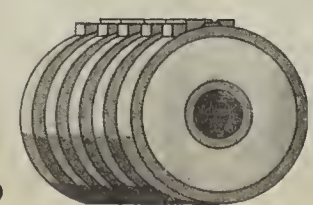

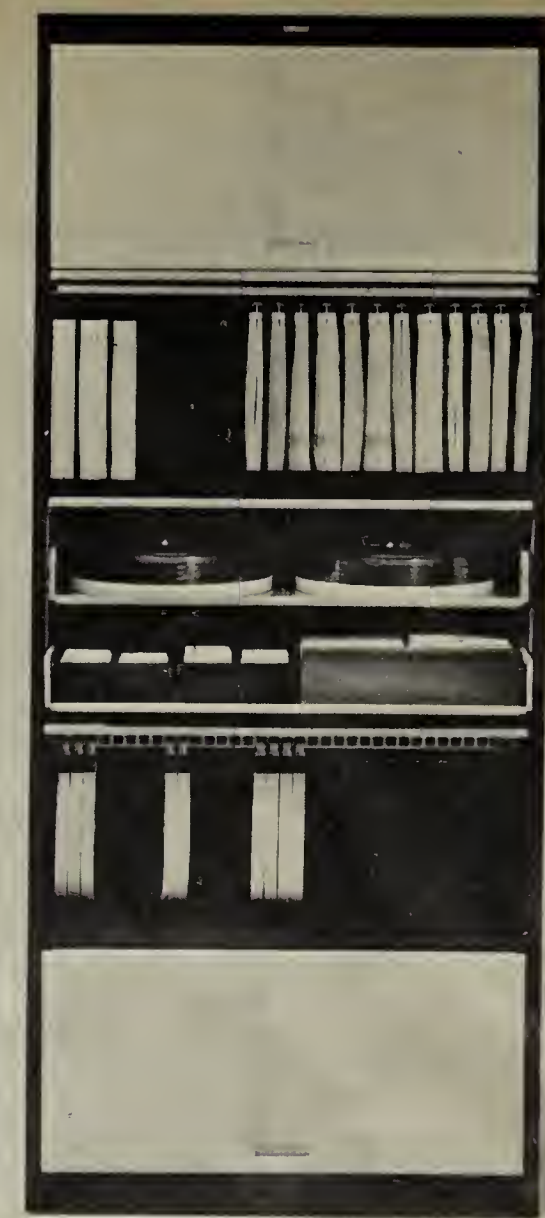

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Security, Shared Facilities Focus of Multitenant Center

By Patrick Ward
Of the CW Staff

PITTSBURGH, Pa. – A multitenant, underground computer center set for construction near here promises the very latest in security and environmental control, according to the builder, Data Center Development Co. (DCD).

Designed to house 12 corporate computer centers, the facility will be able to provide extensive security and environmental control on a shared-cost basis, according to DCD President Charles M. Summerville.

Construction of the multitenant center will begin next year in a wooded, 20-acre site 45 minutes from downtown Pittsburgh.

An administrative level will be above ground, as will most of a second level devoted to mechanical and electrical equipment, but the three floors housing the data centers will all be underground.

The subterranean construction costs less than building the same number of stores above ground, helps cool the building and provides additional security protection, Summerville said.

Rural Isolation

The multitenant center's rural isolation is another security factor, he added. The 20 acres will be fenced in, and visitors will communicate with guards at the center electronically.

Once inside the center, the visitor will check in with guards at the above-ground administrative level of the building and then go through further checks at the individual DP centers below ground. However, DPers will be urged to come to the administrative level to meet visitors rather than vice versa.

There will be coded-card identification systems in use at the data center, but Summerville declined to describe other security measures the center will employ.

However, a minicomputer or small business system will figure in the security plans. The mini will suggest the routes guards should take in patrolling the building, for example.

The mini system will also summon the local fire department in case of fire and drive an audio response system to warn people of the fire and how best to escape from it.

The center will fight fires with Halon in its CPU areas and with sprinkler systems elsewhere.

The administrative computer system will also monitor the health of the heating, air conditioning and power systems. All this equipment is redundant to some degree, Summerville said.

To ensure steady electrical power, the multitenant center will employ a solid-state uninterruptible power source (UPS) which will be able to support the center's entire needs for a 15-minute stretch. This would give generators time to switch on, Summerville said. The generators could then support the center for 15 days.

The multitenant center is also sited next to a main link between power companies, Summerville noted. The center will be able to make bulk purchases of high voltage power and to transform it down themselves, he added.

On-Site Facilities

Tenants could also save by sharing on-site facilities for tape cleaning, certification and rental; document destruction; and overload data preparation.

Additionally, the building's tenants could use common meeting rooms, reception areas and cafeterias, plus on-site medical facilities, scheduled courier service and maintenance staff.

And with 12 corporate data centers, the multitenant center may be able to support its own in-house computer-output microfilm (COM) processing center. It could also enter into bulk purchase or drop-off arrangements with paper vendors, Summerville said.

The multitenant center is also considering proposals from major vendors for on-site service facilities, Summerville said.

As a further economy, the multitenant center plans to use the heat of its own DP equipment to supply its heating and hot water and will even export some to nearby buildings.

How much will the center cost? Summerville was reticent to discuss an exact figure, but said the total would be in the "tens of millions of dollars."

Access Control Gear May Have Weakness

Infrared light, laser, microwave, radar and ultrasonic devices are all part of the arsenal of physical access controls available to security-conscious users.

However, the technical considerations for each of these subsystems must be well understood regarding vulnerabilities to air currents, phase shift, temperature extremes, electromagnetic jamming and so on.

Each of these subsystems has strengths and weaknesses which must be evaluated from a probability of failure and misoperation standpoint.

The search for an operational, nontransferable, cost-effective access system is still in the evolutionary stage. Systems are being marketed which utilize hand geometry, fingerprint and voiceprint verification with high reliability.

Here again, their application must be well defined and consideration given to items such as population and vocabulary size, reliability and repeatability, system recognition time, resources utilized and so on.

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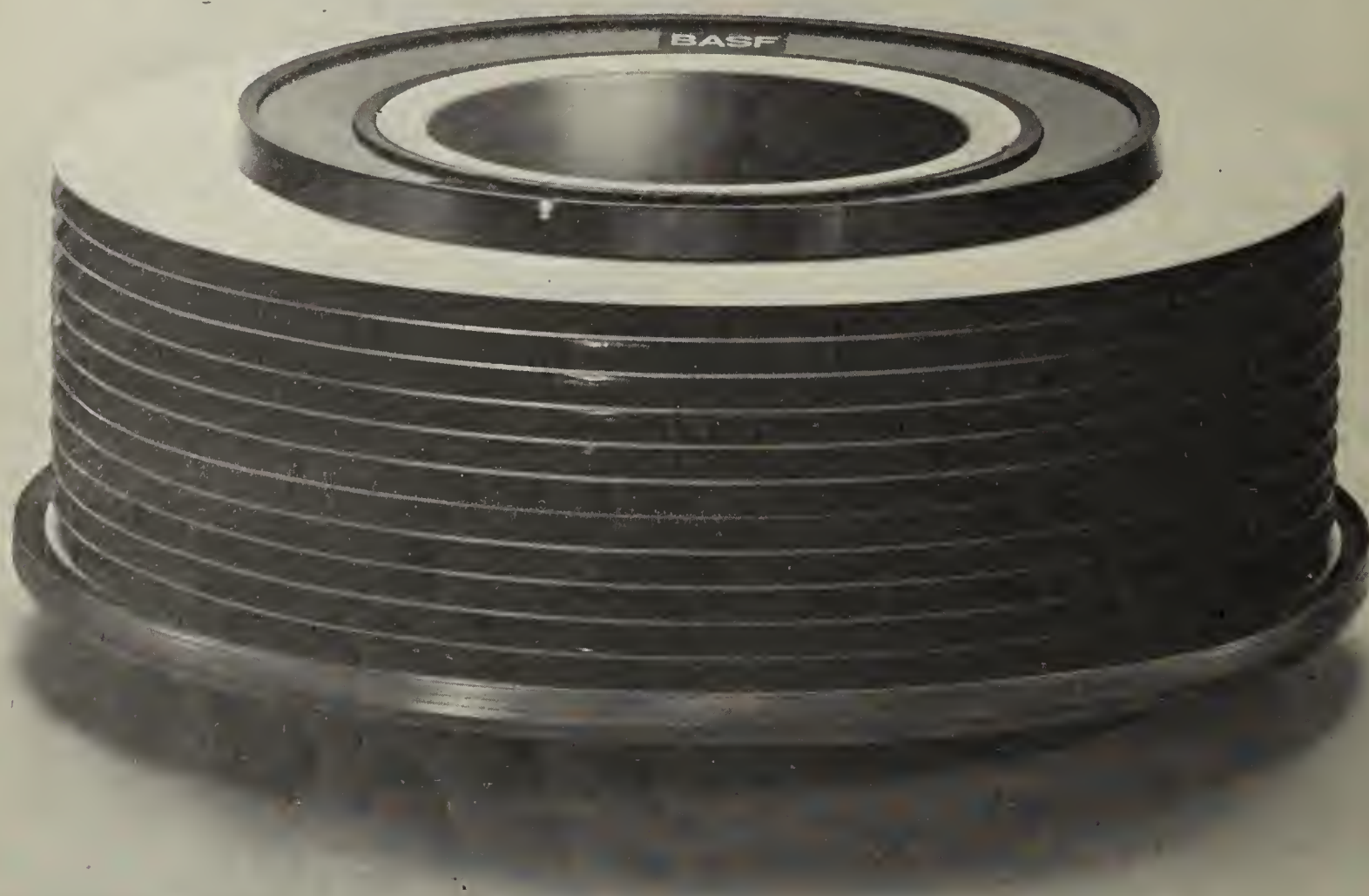
The BASF 1246 Mod II pack.



Because all double-density disk packs conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to *exceed* industry standards. Because there may be times when your disk pack will have to survive excessive head loading, temperature variations, extended use, and other unexpected trials, we make a pack that will go the extra distance for you. Let's look at a few superior points of the BASF 1246 double-density pack.

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Our own coating process

At this high level of packing density, it is even more important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the circumference decreases. In addition, unlike conventional disk packs, double-density disks must be magnetically oriented, which calls for even more sophisticated technology. For these reasons, we've discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

A polished performance

Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. Here again, we're dealing with a double-density medium in which the heads fly much closer to the disk surface than in conventional disk packs. With our new polishing process, we've been able to achieve a surface measurably smoother than the industry norm . . . so flat that the possibility of a head crash being caused by uneven disks is completely eliminated. We might mention here that the coating and binder formulation, combined with coating and polishing techniques, all are important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

Achieving balance

Like any rapidly rotating object, a disk pack will behave strangely if not perfectly balanced. In our precision balancing operation, any weighting required is screwed into place, which eliminates the potential for shifting inherent in a conventional adhesive weighting system.

And to make sure . . .

We test our 1246 disk packs to standards much tighter than those of the leading equipment supplier. If anything unpleasant should happen, we'd much prefer it happen here than on your drive. As a regular procedure, we do scratch tests to check coating thickness, impact tests to determine head crash resistance, detergent tests to check resistance to wear and temperature variations, and drop tests to make sure balance and alignment don't shift during shipment. We test to make sure our 1246 disk packs are error-free.

Finally

Our 1246 costs no more than other double-density disk packs. You're already paying for BASF quality . . . you might as well have it. For more information on the 1246 or other BASF disk packs or cartridges, write to BASF Systems, Crosby Drive, Bedford, MA 01730 . . . or call our nearest regional office: in Los Angeles, (213) 386-7023; in Chicago, (312) 343-6618; and in Clifton, NJ, (201) 473-8424.

You're already paying for BASF quality, you might as well have it.

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Mini Bits

Single Board Equals Five DG I/O Interfaces

MISSISSAUGA, Ontario – A single 15-in. by 15-in. board from Integrant Services Ltd. is said to provide up to five terminal controllers, a real-time clock and a universal print controller for Data General Corp. and Digital Computer Control computers.

This single board has the same function as five Data General I/O interfaces and one Data General print controller, according to the firm.

Called the Integrant Multiport, the board is full Data General-compatible with selectable rates for all five ports ranging from 110- to 9,600 bit/in., the firm said.

The board also provides selectable device codes, current loop or EIA master I/O, and even or odd parity.

Centronics, Data Products, Data Printer printers and other printers are interfaced through the options available in the print controller.

The board has double buffered terminal controllers with 15-volt drivers for increased line lengths.

Selectable real-time clock frequencies are 10 Hz, 100 Hz or line.

The Multiport controller is priced at $2,500 for five ports, a print controller and real-time clock.

The firm is at 1590 Matheson Blvd., Unit 7, L4W 1J1.

Merchandise acceptable for sale in Contempo Casuals' 18 stores in southern California is split for distribution on the Reality system, which automatically prints price tags and distribution tickets.

Dedicated System Serves To Handle Hard Stock Task

VAN NUYS, Calif. – There are few businesses with computerized inventory problems as complex as those found in retailing. And within retailing there are none more complicated than those found in the high fashion industry.

Will Friedman will vouch for that.

Friedman, president of Contempo Casuals, Inc. here, was faced with the problem of keeping track of more than 30,000 items from about 2,000 suppliers – multiplied by six sizes and by 18 stores spread over the southern California area. Not to mention the turnover rate caused by the faddish nature of the fashion industry, in which goods become "hot" overnight and often can die just as quickly.

Contempo originally had used a service bureau and a half dozen in-house people to track inventories, but that system was outgrown by the time Contempo reached a population of 12 stores (today there are 18 stores).

The solution was to bring the inventory system totally in-house, using a Reality computer system from Microdata Corp. and a unique application software package created by Retail-Oriented Computer Systems (Rocs).

The hardware consists of a Microdata 1600 processor with 64K words of core memory, I/O for 24 remote terminals, over 20M bytes of disk storage, a magnetic tape drive and a 300 line/min printer. CRT display terminals are used for operator access to the system, with line printers used for forms and reports printout.

The Rocs software now consists of 500 programs handling more than 100 separate business functions.

Together they constitute an on-line system that allows their people to handle virtually every business function at Contempo Casuals from purchase-order generation to receiving and inspection of merchandise, inventory control, distribution, sales, accounts payable, general ledger work and payroll for Contempo's 300 employees.

One of the prime reasons Friedman chose a Reality system was Microdata's English computer language. The vocabulary uses the same parts of speech people use in everyday life, thus "we could communicate with the computer as if it were just another part of the organization," Friedman said.

The Contempo system, in fact, is even easier to use because Rocs programmers imbedded whole command sentences in single key words to save operator time and reinforce consistency of use. This had resulted in a system that "is so easy to use, everyone was trained on it in a matter of minutes. We didn't even maintain a redundant manual system during the initial start-up," Friedman added.

Prepares Reports

Contempo management uses detailed sales analysis and forecasting reports prepared on the system to make their decisions on which merchandise to buy and when to buy it. The system automatically generates purchase orders for the items chosen by management, and cancellations

(Continued on Page 26)

With Model 12 Memory Range

Decision Data Has S/3-10 Mosfet Unit

HORSHAM, Pa. – An add-on Mosfet memory for IBM's System/3 Model 10 – said to provide increased system efficiency at up to 70% less cost than IBM core memory – is available from Decision Data Computer Corp.

The 5410 System/3 memory is offered in 8K-byte increments up to 56K bytes. A 24K-byte increment of additional storage, for example, is available for $200/mo rental.

Decision Data said the addition of its low-cost memory not only can increase the system capabilities of the System/3 Model 10, but also makes the Model 10 a more attractive system than the recently announced System/3 Model 12.

Cost Comparisons

In a cost comparison, Decision Data said a System/3 Model 10 with 32K and a 300 line/min printer would cost $1,944/mo from IBM on a one-year lease. A Model 12 would cost $1,987; but a Model 10 with a Decision Data memory and printer would cost $1,369.

Similarly, a Model 10 with 48K and a 600 line/min printer would cost $2,858/mo from IBM. A Model 12 would cost $2,656, but a Decision Data-equipped Model 10 would cost $1,753.

Benefits From Savings

With savings of this magnitude available, additional memory can be utilized with a Model 10 to increase its performance potential through faster sorting, elimination of program overlays, faster input/output through double buffering and use of larger blocks, Decision Data said.

With some configurations, the savings could be significant enough to permit communications for applications which were marginally justifiable in the past, the firm added.

Monthly rental prices for the Decision Data 5410 System/3 memory including maintenance range from $115 (for 8K) to $480 (for 56K) depending upon the contract term and the amount of memory selected. Purchase prices range from $4,800 (for 8K) to $12,900 (for 56K).

The firm is at 100 Witmer Road, 19044.

HP Drum Printer Offers 600 Line/Min

PALO ALTO, Calif. – A medium-speed 600 line/min printer is now an option for Hewlett-Packard Co. (HP) users.

The drum-type printer, HP Model 2617A, operates at 600 line/min when printing 136 columns with a 64-character set. It deals readily with predetermined formats such as business forms with a 12-channel vertical format unit (VFU) using commonly available control tapes mounted on the printer.

Under program control, the VFU can slew to the new hole in a tape channel or slew as many as 15 lines. Forms may be single part through six part, HP said.

A switch selects 6- or 8 line/in. An electronic static eliminator helps assure reliable operation at high paper rates and low humidity, according to the firm. Differential line drivers are said to accommodate printer separation from the processor by as much as 500 ft.

64-Character Drums

Drums of 64 Ascii characters are standard. Drums of 96-character Ascii are optional. Print rate is 436 line/min with 96-character sets.

Supplier-built to HP specifications, the 2617A line printer is available from HP in stand-alone form at $15,700.

In fully factory-supported system configurations, in form compatible with systems using HP 2100 and 21MX minicomputers with operating systems of DOS, RTE and 2000/Access types, it is Model 13053A, and its inclusion will add approximately $16,350, varying somewhat with choice of options.

Configured for compatibility with HP 3000 and 3000CX mini data center systems, as Model 30133A, it is similarly priced at about $19,000. First customer deliveries are expected in September from the firm at 1501 Page Mill Road, 94304.

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Mini Proves Strong Inflation Fighter

CHICAGO – One approach smaller businesses are taking to combat inflation and keep overhead down is to switch from manual billing to a minicomputer, said James Schuster, treasurer of Paasche Airbrush Co.

"Before we started to use the minicomputer, everything was done manually by five people. Now, however, we need only two people to handle order entry, inventory, accounts receivable, sales analysis and commission reports," Schuster said.

In addition, he noted, the minicomputer is so much faster than the normal method; the accounts receivable only take one day to do, instead of the three or four that were required before.

"The accuracy of our inventory control has also increased greatly. When you consider that our inventory involves between 4,000 and 4,500 units, that's a lot of merchandise to keep track of."

All inventory control is handled in Chicago by the Basic/Four Corp. minicomputer, which consists of a display terminal, magnetic disk and printer.

"We are planning to expand the computer system to handle general ledger and accounts payable soon, and the advantages to a system like this is the equipment can take the added workload without having to hire more people," Schuster concluded.

Distributed System Handles Stock

(Continued from Page 25)

or delivery data requests can be handled at any time by the on-line system.

As garments are received from manufacturers, they are inspected and either accepted or rejected. If rejected, the system cancels the purchase order and prepares paperwork for the merchandise return to the supplier.

If accepted, the order is confirmed for accounts payable and a voucher and a check are automatically authorized. The basic information from which all other internal transactions will be made has now been entered into the computer: purchase order number, receiver line, style, color, quantity, sizes, invoice number and dating. This is the only point at which information will be entered, unless exceptions are noted later. Otherwise, from this point on, Contempo employees simply refer to the purchase order number and all paperwork is handled by the computer system.

Handles Distribution

Following incoming inspection, acceptable goods are split for distribution to Contempo's 18 stores and the system prints price tags and distribution tickets for shipment from the warehouse, as well as updates the inventory records of each store accordingly.

When one store requests a transfer of merchandise from others, the system is simply notified of the stockkeeping unit, the store-in number, the store-out number and the number of items to be transferred. It produces a transfer ticket by which the merchandise is picked from the racks of one store and shipped to the requesting store. The appropriate changes are made in the inventory records of each store.

All sales at each of the 18 stores are recorded on point-of-sale cash registers, each with a cassette tape data storage system. These tapes are fed into the headquarter Reality system each night for a sales analysis and register audit. From this, changes are made in inventory files and new forecasting reports are generated.

"There is no beginning or end to the system – it's a continuous process now," said Jack Hill, Rocs president, who designed the application software. "Information on Contempo operations is entered by the person who knows most about the data while details are still fresh in his mind. Each employee is authorized to perform certain levels of taks, according to his job, and he begins work with the computer simply by typing in his proper identification code – his name.

"The system responds by displaying a complete list of the jobs he is authorized to perform, selecting from the 100 available functions as designated by the imbedded instruction code words used to initiate particular tasks."

The system even prompts the operator into making corrective responses whenever an error is made. For example, when a purchase order is generated, the system reviews 30,000 possible numbers for accuracy. It even keeps track of the time and the date, so an operator can't enter "Feb. 29" unless it happens to be a leap year. If a particular instruction requires a lot of information outside the scope of the machine, it might well tell the operator to "See Anne."

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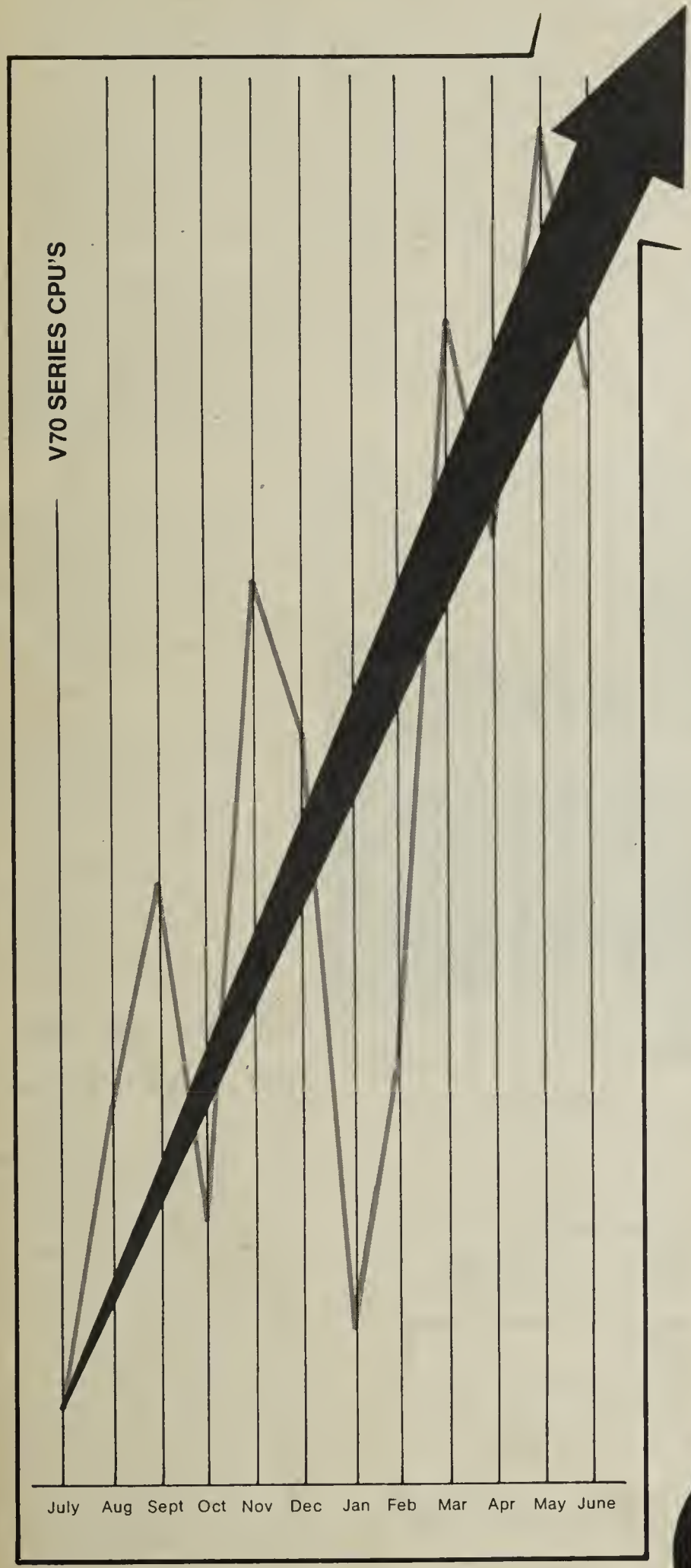

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Grain No Longer a Pain for Farm Co-ops With Minis

LAKE CRYSTAL, Minn. – Most farm cooperatives are major buyers and sellers of grain. As such, they must cope with sharp, often daily fluctuations in commodities market prices. At year end, they must pay dividends to patrons on the basis of their purchases of fertilizer, fuel, other farm supplies, hardware and even household items.

These two factors pose special accounting needs. In south-central Minnesota, five co-ops have bought minicomputers to handle their special needs.

Sone of the five are still perfecting their programming, but those who have completed the changeover from the conventional accounting machines they were using report two major benefits. They're getting far more detailed management information than it was possible to compile before. Also, the time required for processing accounts receivable and payable, payrolls and the general ledger has been reduced by 50% or more.

One big advantage of the minicomputer (an NCR 399) insofar as its use by co-ops is concerned, general managers reported, is its versatility.

Most of the co-ops are inputting directly with the 10-key keyboard. But some are also preparing tape cassettes off-line on NCR 260 data encoders. This permits the minicomputer to process other jobs at the same time and provides for swift input of new data later.

Processing Procedure

At the Crystal Cooperative, General Manager Leo H. Bauman outlined the new procedure for processing the cash and charge purchases of its 1,400 patrons.

Although they receive only one capital credit or dividend check each year, the amount is the total of three computations. Different percentages are applied to purchases of grain, fertilizer and gas and all other commodities.

Although the volume of sales slips fluctuates with the seasons, the daily average is 300. The computer operator batches them by department, then sequences them by serial number to make sure none is missing. Before entering the amount from each slip on the keyboard, he inserts the appropriate patron ledger card in the platen.

When the day's posting has been completed, the central processor searches the tape for the previous day's month-to-date departmental and grand totals and adds them to the new figures for current tallies.

"With our old accounting machine, we were severely limited in the number of totals we could compile," Baumann noted. "But now we're getting separate figures for 35 categories. From a management standpoint, this is a significant improvement."

The daily grain position report for corn, wheat, oats and beans, produced at Morgan, Minn., Farmers Elevator Co., illustrates the sophistication of processing and management assistance the minicomputer makes possible.

Because it is the most complicated, Alice Sellner, the bookkeeper at Morgan, explained how the corn record is compiled: She batches scale tickets by farmer and posts to their individual ledger cards for the loads they deliver each day. Information on the tickets includes bushels, test weight, any damage and moisture content.

To arrive at the net bushels to be paid the farmer, the computer lists the gross bushels of each load and the test weight and damage, then shrinks the gross bushels by the moisture factor to arrive at the net bushels, which accumulate until such time as a check is issued. Also entered automatically as a deductible is the price per bushel and the accumulated dollar total the co-op must charge for drying.

System Divides Load

Reading any such instructions from the magnetically striped ledger card, the computer divides the load appropriately if it is to be split between landlord and tenant. Sellner enters the codes, specifying whether the load is to be sold for cash, is being delivered on a futures contract or is destined for the grain bank. The co-op offers the last as a service for farmers who later order their grain ground and withdrawn for feed.

While the information is being printed and encoded on the individual ledger cards, totals are also being recorded on a magnetic tape cassette. When the processing of scale tickets has been completed, Sellner uses the tape to produce the daily grain position report.

The report, of course, entails additional processing for local sales, shipments, grain bank withdrawals and the like. To arrive at the bottom line, the computer adds inventory and the balance of contracts bought, then subtracts total storage liability, the balance of contracts sold and the balance of futures sold.

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HP Calculator Runs Test, Control System

PALO ALTO, Calif. – A do-it-yourself automatic test and process control system that manages up to 240 individually controlled input/output functions with a single programmable desktop calculator is available from Hewlett-Packard Co.

Designated the HP Interface Bus-Multiprogrammer System, it was designed for industrial process engineers who design, build and program their own input/output expanders and converters to interface various test and process equipment with a programmable controller.

The programmable calculator, as the system controller, is connected to an HP 59500A multiprogrammer interface module which converts the serial Ascii code of the interface bus to the 16-bit parallel format of the multiprogrammer.

The HP 6940B multiprogrammer itself is a mainframe that holds up to 15 plug-in cards, controls the bidirectional transfer of data between its plug-in cards and the multiprogrammer interface.

The cards, which handle stimulus, measurement, control and acquisition functions, are randomly addressable by the calculator-based program, allowing them to be mixed in any order within the mainframe.

A basic modular automatic test and process control system, including a 9820A calculator, HP-interface bus, a 59500A interface module, a 6940B multiprogrammer and several plug-in cards, starts at about $1,000. HP is at 1501 Page Mill Road, 94304.

Cuts Tape Editing Time 80%

Mini Takes the Stage in German Radio, TV Broadcasting

MUNICH, West Germany – A recently installed minicomputer system at the German Institute for Broadcast Technology here will be used to reduce video tape editing time, determine broadcast shadows and wave interferences among proposed European radio stations and schedule personnel, studios and equipment for maximum efficiency.

The Institut fuer Rundfunktechnik (IRT) is a government-sponsored organization dedicated to improving radio and television broadcast technology. Its function is to research and develop ways to improve broadcasting ranging from antenna design to development of computer real-time programs to control remote equipment such as cameras, lighting and video tape recorders.

One area of German TV broadcasting – manual editing of original video tapes – in the past has been difficult, tedious and time-consuming. Scientists at the institute developed a tape editor that uses a Hewlett-Packard (HP) 3000 to improve the quality of the edited tape, prevent damage to the expensive master tape and speed editing time by as much as 80%.

The original 2-in.-wide master tape to be edited is copied onto a cheaper 1/2-in. work tape. Each segment of the work tape is then timed, coded and "memorized" by the computer.

The original master is played again uncut; the computer identifies each scene and, by instruction from the human editor, chooses or rejects it. Wanted scenes are transferred to a second video machine and recorded in the proper order on what becomes the edited and final 2-in. master copy.

The HP 3000, through its HP 2100 series front-end processor designed for real-time applications, controls the video tape machines. While the uncut master tape is played back as it was originally recorded, with scenes out of sequence, the second tape machine records chosen scenes where they belong.

Using a computer drastically reduces editing time. For instance, a variety show that typically took as long as three weeks to edit can now be done in three or four days – or about one-fifth the time needed for manual editing, according to Dietrich Sauter, the computer center manager.

Another application for the minicomputer system is a program designed to optimize radio broadcasting. Given the location of a proposed radio transmitter, the mini can suggest several possible frequencies and power ranges as well as appropriate antenna shapes to achieve maximum broadcast quality over the intended area, while minimizing interference with already existing stations.

"In another area, the mini can streamline network operations," Sauter said. "IRT has developed a program that lets the computer take over some of the important housekeeping functions.

"It can schedule all personnel, studios, equipment such as video and sound recorders, lights, cameras and control consoles. This prevents piling up of TV shooting dates and insures that the right equipment is available in the right studio to the right people.

The institute's system includes a 96K-word main memory; 5M bytes of fixed-head disk storage; two moving-head disks with 47M bytes of storage each; two 9-track, 800-bit/in. magnetic tape units; one 1,200 line/min printer; a 600 card/min reader; a 600 card/min punch; a console printer; and two display terminals.

Tally Serial Printer Has Micro Electronics

KENT, Wash. – A 120 char./sec dot matrix serial printer from Tally Corp. features microprocessor electronics and digital control printhead advancement.

Designated the Series 1000, the 132-column, multicopy desk unit has a needle printing technique, microprocessor-oriented electronics, cartridge ribbon and tractor engagement above and below the print line.

Character-by-character visibility is achieved with a printhead movement technique that moves the printhead a fixed number of columns after a pause in the printing operation, the firm said.

The Model 1120 can print an original plus four carbon copies and handles form widths from 4- to 15 in. Specifications include 6 line/in. line spacing, 10 char./in. character spacing, a 64-character Ascii character set and a 9 by 7 half-space matrix character.

Interfaces are available, and unit prices for the printer start at $2,575, the firm said from 8301 S. 180th St., 98031.

XEROX

By now, everyone is aware of Xerox's recent announcement to withdraw from the computer mainframe business. It is our understanding, however, that Xerox will continue to support the users in terms of maintenance, spares and peripherals, but it is also clear that this withdrawal from the market place has to eventually reduce the amount of support that individual users can expect.

Quelex Data Systems, as the parent company of Tracom, Inc., has been providing total second source hardware support for the Xerox market place for five years and, of course, it is our plan as Tracom, Inc. to continue that support on an ever-increasing basis. Last year, we provided over three million dollars worth of Xerox equipment and services.

Service includes stocking an inventory of equipment spanning the entire product line from cards to total systems. All equipment is guaranteed both to meet or exceed Xerox specifications and to be acceptable for Xerox maintenance. Additionally, Tracom maintains a service facility for the repair and refurbishment of customer owned equipment – including a Clean Room for RAD repair. Our inventory of equipment for sale includes a stock of approximately 20,000 "T" series modules, several RAD bulkheads, tape drives, and 8 CPU's ranging from the Sigma 2 to the Sigma 7. All equipment that we provide, with the exception of our Data Products Line Printer System, is of Xerox manufacture. Our deliveries are effectively off-the-shelf, and our prices significantly less than those of Xerox. Our combined facilities dedicated to the Xerox systems product line total over 30,000 square feet.

We have for some time now encouraged customers to consider their own maintenance based on the fact that a large number of users have made significant savings in money and downtime, aside from self-sufficiency considerations. In light of Xerox's current position, it is now more important than ever that the customer consider his own maintenance. We are fully equipped to provide the complete spectrum of services from technical support (training), repair services, spares, expansions, and complete systems.

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GENERAL AUTOMATION

With DP Training Available

Mini Peaks Schoolboys' Interest

NOTTINGHAM, England – Trent College, an independent boys' school with some 500 pupils, is now able to give every pupil computing experience at some stage in his school career, the minimum being a term's programming in Basic in the third year.

In practice, a minicomputer has generated what the headmaster, A.J. Maltby, recently described as "frenzied enthusiasm" among his pupils and is frequently in use for 14 hours a day.

This year about 25 pupils tackled individual projects. Games, simulations and teaching programs proved popular for this, although one student wrote a program to supply automatic course corrections for aircraft in flight, based on wind speed and direction and distance traveled.

Other projects carried out by pupils include programs to play Monopoly; golf; noughts and crosses; Mastermind, a program to perform integral calculus; a tank gunnery range simulation program; a rocket simulation program; and a Latin teaching program.

The computer, a Data General Nova 2 with 16K words of memory and a keyboard/printer terminal, cost the school about $7,400. This, according to W.P. O'Shea, the master in charge of computing, makes it an excellent investment when compared with the cost of the time-sharing service on which the school previously hired time.

It also allows the pupils far greater freedom of access to the machine. Despite the extremely heavy use which the computer receives, it developed only one minor fault in the whole academic year, he said.

OEMs Sign Up for ICC '75

NEWTON, Mass. – Heralded as the "OEM Conference of the Year," the 1975/76 Invitational Computer Conference (ICC) season gets under way here Sept. 30.

The conference has five technical seminars, new-product introductions and displays of equipment and systems by more than 20 OEM computer and peripheral manufacturers. Participants in the series include: Ampex, Computer Automation, Control Data, Data Disc, Data Printer, Dataram, Digi-Data, EMM Computer Products, Facit-Addo, Hewlett-Packard, Interdata, ISS/Univac, Memorex, MITS, Mohawk Data Sciences, Pertec, Plessey Microsystems, Remex, Sykes Datatronics, Tally, Tektronix, Varian and Victor Associates.

The conference will be launched with five technical seminars:

- "New Concepts in Disk Computer Technology," presented by Hewlett-Packard.
- "Flexible-Disk Drives and Systems," presented by Remex.
- "Minicomputer Hardware/Software," presented by Interdata.
- "Evaluating the Total Cost of Ownership When Selecting Peripherals," presented by Pertec.
- "There are Thin Film Heads in Your Disk Future," presented by ISS/Univac.

Other conferences in the ICC season are scheduled for: Oct. 21 at Cherry Hill, N.J.; Oct. 23 at Long Island, N.Y.; Nov. 20 at Palo Alto, Calif.; Jan. 15 at Houston; Feb. 17 at Ft. Lauderdale, Fla.; March 25 at Orange County, Calif.; and April 13 at Cleveland.

Invitations are available from participants or B.J. Johnson & Associates, 300 Otero, Newport Beach, Calif. 92660.

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COMPUTER INDUSTRY

CI Notes

Calcomp Jilts Braegen

ANAHEIM, Calif. – California Computer Products, Inc. (Calcomp) has terminated its agreement to acquire Braegen Corp. and has abandoned plans to enter the terminal business.

Calcomp's decision came almost a year after it announced its intentions to get into the terminal field by acquiring Braegen [CW, Aug. 21, 1974].

Calcomp President Lester L. Kilpatrick said preliminary estimates for the fourth quarter indicate a pretax loss of about $9.5 million. This includes a charge of about $6 million for writing off the operating capital advance to Braegen and establishing additional reserves to terminate the product line.

Comsat General, IBM Delay Filing

WASHINGTON, D.C. – Comsat General and IBM have postponed filing a plan with the Federal Communications Commission (FCC) detailing their third partner in the CMI Satellite Corp. venture.

A Comsat spokesman said there is no partner as yet.

When confronted with opposition by the FCC on their plans to become partners in CML by buying out Lockheed and MCI, IBM and Comsat General indicated they would introduce a third partner, which was one of the schemes outlined by the FCC. They said originally they would file within 60 days [CW, June 25].

Comsat General recently purchased the outstanding stock of both MCI and Lockheed as a temporary measure. Both companies were paid $1.5 million with another $1 million due later.

HIS To Refer Sierra System

WALTHAM, Mass. – Honeywell Information Systems (HIS) has agreed to market Sierra Research Corp.'s factor data collection system on a referral basis. The Sierra system uses a Honeywell minicomputer.

"Sierra's factory data collection system will provide our customers with a system capability not previously offered," Richard R. Douglas, Honeywell vice-president, said.

"Under the agreement, Honeywell customers will buy or lease the system directly from Sierra," he explained.

Correction

Cummins-Allison Corp. markets its 4400 Keyscan system incorporating scanning and key-to-disk [CW, Aug. 13]. The firm at one time considered interfacing a Ball Computer Products, Inc. page reader to the system.

Venture Predictions Realistic

Vendors Say Floppy Business Picking Up

By Molly Upton
Of the CW Staff

The floppy disk drive market has picked up considerably in the last six months, vendors have reported.

Although many indicated the market has been developing more slowly than anticipated, they generally agreed the industry is beginning to hit its stride and projections contained in Venture Development Corp.'s study for shipments between 1975 and 1978 are realistic.

Venture projected 435,000 units will be sold between 1975 and 1978. Of these units, 293,000 will be OEM, the market research firm located in Wellesley, Mass., forecast.

W. Farrell Sanders, director of marketing at Shugart Associates, Inc., said he thought the figures were pretty optimistic when they were issued about a year ago, but business has improved to such an extent the figures look possible.

Sanders thinks Shugart will ship 10,000 units in calendar 1975, compared with 4,000 units in 1974.

Ray Werner, vice-president of marketing for Orbis Systems, Inc., said an increasing number of firms are taking drives for evaluation purposes.

Orbis used to put one or two drives out a month to new prospects; within the last two months, however, it has placed drives with 25 prospects, he said.

Volume shipments are also up, Werner said, but are less than customers had projected earlier. "The requirements have not been as great as they thought they would be," he explained.

He attributed this to customers' reluctance to build up inventory.

Shipments at Orbis are now averaging about 150 to 200 unit/mo, he said.

Ron Dorner, product manager for California Computer Products, Inc. (Calcomp), said business was at a standstill between November and February.

But the upswing since then has been so dramatic Calcomp is now production-limited. It doubled its capacity recently and now runs two shifts, although the second is not fully loaded, he said. Dorner expects Calcomp will ship 1,300 units this month.

Slow Popularity Growth

The floppy's popularity developed somewhat more slowly than had been expected by the industry, Dorner acknowledged, and attributed this to the effect of new technology on the scene.

"Any time there is a ripple of technological developments," such as double-density or dual drives, "a certain portion of customers wait on orders," he said.

At Control Data Corp., Tom Farrell said

(Continued on Page 34)

Singer Revamps Marketing Unit, Plans Elimination of 300 Jobs

NEW YORK – Singer Co.'s Business Machines Division is reorganizing its marketing organization to concentrate maximum effort upon retail business and the rapidly expanding terminal-oriented systems market.

The move will be accompanied by the elimination of about 300 jobs across the board, a spokesman said.

No equipment lines will be eliminated, President Richard O. Baily said, and customer support will be continued.

The domestic DP systems and retail systems operations have been combined into a single unit under the direction of Robert W. Casey, vice-president for domestic marketing. Casey previously headed retail systems marketing.

"The division between systems and retail was arbitrary," Baily said, ". . . and it was difficult to sort out whose customer was whose" since many have both manufacturing and general accounting operations as well as retail stores.

Baily denied the rumors that Singer is dropping systems to go into retail. "Nothing could be further from the truth," he said. "We can push one without dropping the other."

However, he did acknowledge the move is designed to push Singer systems in those areas where they are best suited, such as data communications and terminal-oriented use, and makes good economic sense.

Singer has never promoted the System Ten as a strong batch machine, he said, although there are a number of uses for it in batch, specifically where Singer has software packages, such as the client accounting package and Spa, a general accounting package.

"We will continue to market that product. We're not going to withdraw from that overnight," Baily said.

"My view would be that at some period of time . . . several years down the road, our activities in that regard will be less in favor of the activities that we are pursuing with more vigor."

Singer is examining individual customer situations and "we are making provisions to be sure we can continue to support that customer," he said.

Memorex Gets Soviet Disk Order

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Memorex has received the first Soviet order for 2314-type disk drives for use with Soviet Riad computers.

The order is for three Memorex Model 661 control units and nine Model 660 disk drives to interface with Riad Model 20 systems installed in service bureaus in Belgium, Finland and The Netherlands.

The Riad systems, which are built along the lines of the IBM 360 series, are plug-compatible with Western, independent-made IBM-compatible peripherals, according to Eugene Douglas, Memorex director of international trade and government affairs.

The deal was consummated by the firm's East Bloc marketing representative headquartered in Brussels.

The service bureaus where the 30M-byte units will be used are being operated as joint ventures under the Soviet Electronorgtechnica and nationals of the countries where the service bureaus are located.

Sources say the Soviets have developed a similar 30M-byte disk drive, but no production units are yet available.

The sale is believed to be part of a Soviet effort to develop a showcase for its Riad systems.

"These service centers will provide the USSR a visible platform to demonstrate its equipment. They will give potential users a far better opportunity to observe their operation over the long term than they could get on periodic technical visits," Douglas said.

The only hitch is getting an export license. Under present export law, disk drive shipments bound for Western European countries require only Commerce Department export license.

Since these disk drives would be going to joint ventures involving Soviet citizens, however, the case is no longer "clear-cut," a Commerce Department spokesman said. Such an export license would require interagency clearance, which means the Defense Department must approve the deal.

Last year IBM attempted to sell the Russians used IBM 2314 and 2319 disk drives. The sale never came off.

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Printer Industry Seen Growing 15.4% Annually

SAN JOSE, Calif. – The computer printer industry is growing at a faster rate than the computer equipment industry as a whole in terms of value of equipment shipped, according to a Creative Strategies, Inc. (CSI) report.

CSI estimated shipments of printers in the U.S. will increase from $912 million in 1973 to $1.87 billion in 1978, for a compound annual growth rate of 15.4%.

The greatest growth potential for computer printers lies in minicomputers, according to David G. Merrifield, industry analyst for CSI. By 1978, 20% of all minis will be equipped with printers, he forecast.

"Printers now have the major portion by value for the market for computer output," Merrifield said. "This market share should increase from 54% in 1974 to 59% in 1979.

"COM recorders and teleprinters will also increase their market share, while CRT terminals will lose share by value," he predicted, adding that this was not surprising since the costs of CRT displays and electronic memories will continue to decrease significantly over the next few years.

The nonimpact market has not grown as quickly as predicted a few years ago, Merrifield noted. The lack of multicopy capability and the special paper requirements of most machines have been overriding considerations in selecting printers.

"The multiple copy problem, while having potential solutions, will require a change in thinking by the DP community in order to shift the production of additional copies to the off-line environment.

"IBM generally discourages this move, as evidenced by its new nonimpact laser printer which is offered only in an on-line setting," Merrifield remarked.

Floppy Drive Business on Rise

(Continued from Page 33)

production capacity is still ahead of sales. The floppy market is a year slower in developing than he had expected, he said, adding the market is "developing beautifully." The business I forecast for a year ago is coming in now.

Farrell is marketing manager at the Hawthorne plant, now part of the CDC-Honeywell joint venture, Magnetic Peripherals, Inc.

Keith Plant, Memorex Corp.'s director of OEM marketing, concurred, saying "the market has definitely not developed as fast as had been predicted."

Kurt Dexter, national marketing manager at Innovex Corp., also agreed. "There is no question the product is a year behind schedule in acceptance and getting into the field," he said.

Farrell said he underestimated the problems customers would have designing in floppies. "It's a lot easier to build than for customers to design software and the controller," he said.

He expects to be shipping more than 1,000 unit/mo by the end of the year.

Farrell suggested extending the time frame of the Venture estimates by one year to get accurate figures.

Most of the Venture report seemed to be based on consumption in the DP industry, he said, but there are emerging non-DP areas, such as games and teaching, which could eventually cause the estimates to be on the low side.

Venture called for 51,700 units to be shipped in 1975, of which 29,500 will be supplied by non-IBM sources. The market value, which will be $26 million in 1975, will rise to $50 million by 1977, when total shipments will be 126,800 units, with 86,800 supplied by independents.

Price erosion, which has been a factor in the industry, seems to have come to a halt, most vendors agreed.

For large orders, drives are selling at under $350 with an electronics card, Shugart's Sanders said, whereas a year ago the price was between $75 and $100 higher per unit.

Dexter of Innovex observed he has seen some signs competitors are holding the line on prices, although there is still some chasing around for a first big order.

Plant of Memorex said there might be a gradual erosion over five years, resulting from more cost-effective use of materials and labor, but "nothing like we've seen in the past year and a half."

Calcomp's Dorner said if one computes the price of drives by dividing revenues by units shipped, the average price will fall about $100 to $350 by next year.

The cause is not further cuts in prices, but rather increased shipments under large contracts, he explained.

While the Venture study indicated the floppy scene would be unprofitable overall until 1976, several firms reported they are already profitable, and the rest expect to be so shortly.

Orbis is profitable, said Werner, adding he's glad the firm had held its gross margin on some of the larger contracts, although it was not selected for them.

Dexter said Innovex expects to be profitable very soon.

Shugart has been profitable for six months, Sanders said.

Calcomp is very close to cash flow break-even in the floppy area, Dorner said, adding he expects profitability for the fiscal year ending next July.

Memorex's non-IBM-compatible floppy drive program is profitable, Plant said. Since the product's inception about two years ago, Memorex has shipped 14,000 of its noncompatible drives, he said.

NCR Banking Order Worth $35.7 Million

DAYTON, Ohio – NCR Corp. has landed its second huge order from Japan's Sumitomo Bank.

The latest order is for $35.7 million worth of equipment including 2,400 Model 272 financial terminals, video display terminals and 200 NCR 721 minicomputers.

The equipment supplements NCR's recent installation of $24 million worth of Century 350s in Osaka and Tokyo.

Installation of the terminals and minis, which will be used as communications controllers for terminals in 190 branches, will begin next year, NCR said.

The bank's system handles 250,000 on-line transactions per hour.

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And combined with these powerful performance features are quiet 30-characters-per-second printing speeds and communications features that help reduce over-all system costs.

Improving man's effectiveness through electronics

With 220 WCS Shipped Since April

Wang Resolves Identity Crisis, Aims at System Mart

By Molly Upton
Of the CW Staff

TEWKSBURY, Mass. – Wang Laboratories, Inc., which has been calling its products "calculators," is now admitting it is, in fact, in the computer market.

Previously the company preferred its identity in the calculator area, and for some products still retains that nomenclature.

For instance, in marketing to the General Services Administration, calculators do not have to be approved with all the red tape necessary for computer sales.

Now, although the dollar volume is about the same as previously, Wang's government sales account for 10% rather than 20% of its total business, according to John Cunningham, senior vice-president of domestic marketing.

The change in self-identity is the result of both internal and external factors, he said.

As microcomputers have increased their capability and range of applications, the industry has changed its idea of what a computer is, and Wang has decided to more closely identify with what is now a large part of its market and is expected to become even larger with its future products, he said.

About 65% to 70% of current shipments are computers, and over half of these are the Wang Computer Systems (WCS) series introduced last April, he said.

About 220 WCS systems have been shipped domestically, Cunningham said, and the firm is shipping about 250 small disk-based systems a month.

New orders total between $84 million and $85 million, Cunningham said.

The WCS is an improved version of the 2200, called the 2200T internally, and is now also being offered in the calculator area.

Wang has about 20,000 installations of machines in the range of the disk-based 700 series and up, he said.

Three Target Markets

The company is aiming at three principal computer markets in North America, with the WCS targeted at all of them, he said.

The largest computer market at which Wang is looking is the technical market, followed closely by the small business area, both first-time users and departments of corporations with DP centers, and then replacement of visual record machines.

John Cunningham

With about 360 service personnel in North America, Cunningham sees a potential to generate engineering revenues, he said.

Wang's vertical market targets include the medical area, auto dealers, construction, certified public accountants, fuel oil distributors, calculating and education, he said.

Wang is building a list of software packages that have been designed by outside software houses as well as internally generated systems so users may not have to buy customized software, he said. This is in addition to the Swap program run by the user group, he noted.

A network of about 150 software houses provide customized programming.

There is no question that IBM is going after the under-$50,000 market, Cunningham said, but added he thinks it will "leave some nice niches" which will be larger than they are now.

Although Wang does not intend to go head-to-head with IBM, it does meet the System/32 and System/3 in certain sales, he said.

Overseas Markets

Wang's identity in the European market has been more like that of a minicomputer company than of a calculator company since it began marketing there in the late '60s, Gerry Jones, senior vice-president of international marketing, said.

Because Wang entered the European arena later, it didn't begin with the low end of the calculator line as it did in the U.S., he said. Also, the systems in Europe tend to be bigger, he added.

Business in Europe is traditionally in the statistical, engineering, laboratory and university area, and "we're trying to learn our way into the [commercial] market somewhat more gradually" than an overnight conversion," he said.

Wang's European sales have grown 60% a year for the past six or seven years, Jones said, and the firm has its own subsidiaries and provides its own service.

Service is an important key to foreign sales, Jones said. Since Wang started its own subsidiary in South Africa six months ago, it has done more business than its representatives did in six years, he said. A large part of that is attributable to having a service capability, he added.

Issi Buys Memorex 3675s

SANTA CLARA, Calif. – Under an OEM agreement, Interscience Systems, Inc. (Issi) will buy and market Memorex Corp.'s Model 3675 double-density, dual-spindle disk drives.

Purchases will total nearly $5.7 million. Issi intends to market its Model U3830 microprogrammable controllers, integrating Memorex drives, to users of Univac 1100 series and selected Control Data Corp. systems.

Issi will supply full software support while Memorex will offer subsystem maintenance on a third-party basis.

Systems network adaptability

If your business system involves tying your Model 742 terminals together in a complete communications network, TI offers the Model 700 TPS* Terminal Polling System.

Designed around the TI Model 960 Series minicomputer, the TPS automatically calls remote "Silent 700" data terminals, collects data stored on the magnetic tape cassettes, and logs the data on magnetic tape in a format readable by a host computer.

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Minis to Jump

MENLO PARK, Calif. – The annual value of minicomputer system equipment shipments will reach $6.1 billion by 1982, according to a report issued by Gnostic Concepts, Inc.

"This growth will be achieved as price erosion for CPUs and peripherals continues to open up new applications and thus broaden the market base," it said.

To date, nearly 60% of all minicomputer hardware has been shipped to OEM suppliers, system houses or sophisticated users.

A new trend is developing, however; the greatest proportion of dollars will be in the end-user segment, although OEM quantities will remain a high proportion of the total quantity shipped.

In 1974, minicomputer hardware represented 13% of the total $8.8 billion U.S. computer hardware market, the report said.

By 1982, that figure will grow to over 30% of the total of $20.3 billion.

By Outselling Victor in U.S.

Nixdorf Makes Good on '73 Prediction

CHICAGO, Ill. – Two and one half years ago, Heinz Nixdorf decided to buy out the computer division of Victor Comptometer Corp. here, which had held exclusive marketing rights for Nixdorf business systems in the U.S.

Nixdorf said his people could outsell Victor, a firm that installed 1,000 systems in the four years the equipment was sold under Victor's name.

Nixdorf apparently was right. Since January 1973, Nixdorf's team of 500 has increased its user base to 3,000 installed systems, the firm said. During the first year of direct sales, Nixdorf's U.S. revenues increased 45%, but the company was still losing money.

That year was marked by high start-up costs as greater emphasis was placed on branches, but this spring, the company broke even, according to James Daly, executive vice-president and general manager, who added that despite the recession, "we're already ahead of last year."

The secret, Daly said, is providing true turnkey service.

"A lot of companies that sell so-called turnkey systems sell the system and the software and then the user is on his own," Daly said.

"We don't do it that way. Our sales representatives sell the system and then our systems analysts come in to design the system.

"Only after the customer signs off on the documentation are the programs written," he said, "and when the customer signs off on the programs, the system is implemented."

Nixdorf field engineers solve customer equipment problems by replacing components on-site and then repair ailing gear at the local service office. This allows Nixdorf to provide four-hour service, a spokesman explained.

Although U.S. employees still number only 500, about 30 more than on Victor's payroll, Daly says they're utilized better.

"We've doubled the size of our branches and reduced our headquarters operation here to 10% of our operating costs. We now have people in about 40 locations," he said.

Nixdorf's U.S. subsidiary is selling two systems to U.S. customers – its models 820 and 840. The 820 ranges from 8K to 24K bytes and sells for about $15,000 to $40,000, excluding software and additional peripherals.

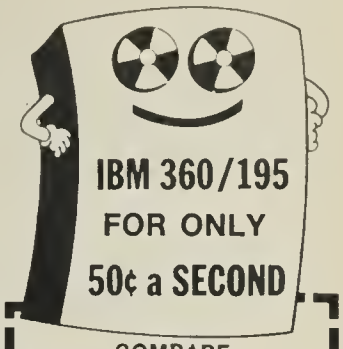
The 840, by comparison, also offers 8K to 24K bytes and features a faster matrix printer and an electric typewriter alphanumeric keyboard and can be equipped with disk storage. The 840 costs $20,990 to $39,950.

According to Daly, Nixdorf's toughest competition comes from NCR, Philips, Burroughs Corp.'s L series equipment and the Singer System Ten.

Daly said Nixdorf has some new gear waiting in the wings – but to say anything more right now would be a bit premature, he added.

Doing business in the U.S. is quite different from the European marketplace because "you can take a more vertical approach here," Daly explained.

"In a country such as Denmark, you might be able to sell the same application within the same industry over and over again."



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Executive Corner

Top GA Posts Vacated

ANAHEIM, Calif. – General Automation, Inc.'s (GA) president and vice-president have resigned in the latest of a series of management maneuvers at the minicomputer firm.

Raymond J. Noorda resigned as president and Michael A. Ford as vice-president.

Lawrence A. Goshorn, chairman, said he would become cheif operations officer.

Other Moves

Dick H. Brandon, founder of Brandon Applied Systems, Inc., has resigned as chairman of the firm to pursue consulting and other interests. He will continue to serve as a director.

- Norman J. Rothstein has resigned as director of product marketing at Prime Computer, Inc. for personal reasons.
- Herbert G. Price has been elected senior vice-president of Mohawk Data Sciences Corp.
- James R. Grimm has been elected senior vice-president for finance and administration, James A. Barth has been named vice-president and corporate controller and Richard K. Hansen has been named vice-president and counsel of Pertec Corp.
- Peter R. Genereaux has been elected executive vice-president of Western Union Teleprocessing, Inc. and appointed general manager of the firm's Western Union Banking Systems Division.
- John M. Minicucci has been appointed vice-president of marketing at Ring Systems Corp.
- Dr. William G. Darnell has been elected a vice-president and Jack Steinberg has been elected a vice-president and staff technical director at Kappa Systems, Inc.
- Christopher J. Lynch has been named vice-president of field marketing/Northeast of Honeywell, Inc., succeeding G. Martyn Kingsland, who will retire next March.
- Lee G. Hallgren has been appointed vice-president of planning and systems support for the Field Engineering Division of Itel Corp.'s Data Products Group.
- J.L. Reed and C.A. Ousley have been named Control Data Corp vice-presidents of government and military marketing for the western and eastern regions, respectively.
- Ben Wheat has been named senior vice-president of Boeing Computer Services, Inc.
- Bruce Cross has been named vice-president of sales and marketing for International Computer Programs, Inc.

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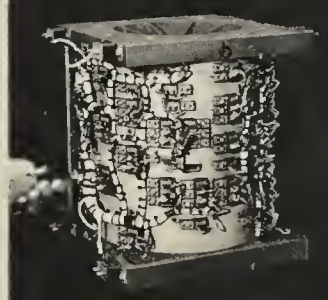

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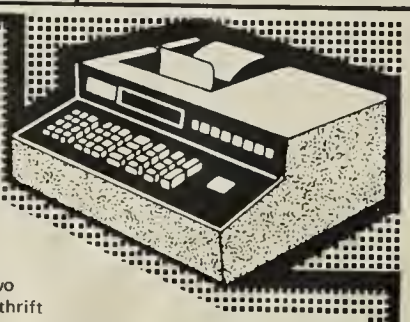

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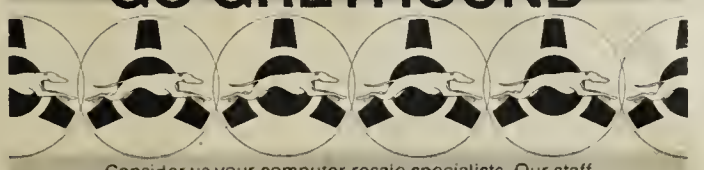

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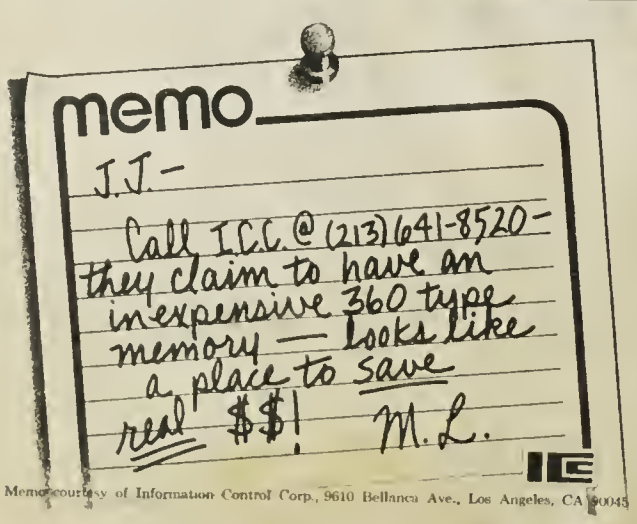

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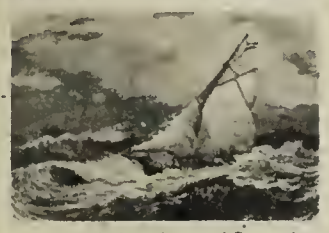

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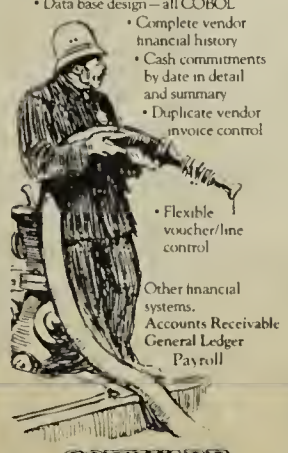

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MAYNARD, Mass. – Digital Equipment Corp. reported record earnings and revenues for the fourth quarter and year ended June 28.

For the year, revenues rose 27% to $533.8 million compared with $421.9 million last year, while earnings grew to $46 million or $3.85 a share compared with $44.4 million or $3.80 a share last year.

During the quarter, revenues rose 19% to $160.5 million compared with $135.2 million in the year-ago period.

Earnings climbed to $17.4 million or $1.46 a share compared with nearly $16 million or $1.36 a share in the same 1974 quarter.

The relative lack of strength in the original equipment manufacturer, industrial and large-scale computer markets continues to persist due to the recession, the firm said.

Shipments Up Almost 50%

VRC Nine-Month Earnings Inked in Black

NORTH SPRINGFIELD, Vt. – Aided by third-quarter results, Vermont Research Corp. (VRC), posted turnaround earnings during the nine months as well as the quarter compared with losses in the year-ago periods.

The operating losses sustained in 1973 and 1974 resulted in large part from new product development, Hugh M. Taft, VRC president, explained.

"We are now beginning to reap the benefits of that period of concentrated engineering and development effort and are confident sales of these new products will continue to grow in the periods ahead," he said.

Product shipments were almost 50% higher than a year ago, and the increase in shipments compared with last year consist primarily of rotating memory products developed within the last two years, Taft said.

During the third quarter, the firm earned $136,420 or 19 cents a share compared with a loss of $38,487 or 5 cents a share in the same period last year.

Revenues rose to $1.5 million compared with $1.1 million in the 1974 period.

During the nine months, earnings totaled $198,776 or 28 cents a share compared with a loss of $226,497 or 31 cents a share in the year-ago period.

Revenues spurted to $4.1 million compared with $2.7 million in the same 1974 period.

Year Earnings Dip at Wang Labs Despite Strong Orders in Quarter

TEWKSBURY, Mass. – Although Wang Laboratories, Inc. had its strongest quarter for orders and shipments in the fourth quarter, the firm's earnings in the quarter and year were below those of the year-ago periods.

Quarterly results were adversely affected by year-end inventory write-offs of $1.3 million which, together with greater-than-anticipated investment tax credits, reduced the effective tax rate for the year.

For the quarter, orders rose 36% to $27.6 million and revenues totaled $24.9 million, a 24% rise compared with $20 million in the same 1974 period.

Earnings fell to $1.5 million or 36 cents a share in the quarter compared with $1.9 million or 46 cents a share in the year-ago period.

During the year, orders rose 30% to $83.5 million and revenues reached $75.8 million, up 19% compared with $63.9 million in 1974.

Earnings were nearly $3.3 million or 80 cents a share compared with $4.9 million or $1.20 a share last year.

During the quarter, 33% of Wang's orders for the year and shipments occurred, leaving it with the highest backlog in history.

President An Wang said he is "optimistic that the economic factors which have plagued the economy have turned around at least for Wang Laboratories, and that our upward trend has begun."

AJ Net Rises 28% in First Quarter

SUNNYVALE, Calif. – Anderson Jacobson, Inc.'s (AJ) earnings rose 28% while revenues increased 58% in the first quarter ended June 30.

Although quite satisfactory, the gain in income was held down by inflationary factors that increased unit costs, a 55% increase in product development activity and a 51% increase in marketing expense, according to Raymond E. Jacobson, AJ president.

These increases, he said, stemmed partly from needed development and marketing efforts for the firm's new computer systems activity.

New orders declined in the first quarter because of the recession, increased competition and a delay in the introduction of the AJ 830 keyboard printer terminal, he said.

Revenues rose to $4 million compared with $2.7 million in the year-ago period, with increases in both lease and service, to $3.4 million, and sales, to $667,374.

Earnings totaled $194,572 or 8 cents a share compared with $152,485 or 6 cents a share in the same 1974 period.

Second Quarter Sets Records at Modcomp

FORT LAUDERDALE, Fla. – Record second-quarter revenues and earnings were the story at Modular Computer Systems, Inc. (Modcomp) for the period ended June 30.

Revenues rose to $9 million compared with $6.1 million in the year-ago period while earnings grew to $594,000 or 20 cents a share compared with $485,000 or 18 cents a share.

During the six months, revenues climbed to $17.7 million compared wtih $11 million in the same 1974 period.

Earnings totaled $1.14 million or 38 cents a share compared with $1.08 million or 39 cents a share in the year-ago six months.

Dataproducts Quarter Net Boosted By Sale of Holdings in Data Card

WOODLAND HILLS, Calif. – Dataproducts Corp.'s revenues declined during the first quarter compared with the year-ago period, but earnings rose, bolstered by the sale of part of its holdings in Data Card Corp.

Revenues declined 13% to $18.7 million compared with $21.5 million in the same 1974 period.

Earnings rose to $1.7 million or 25 cents a share compared with $1.4 million or 20 cents a share last year. The after-tax profit from the sale of 61% of its holdings in Data Card Corp. was $739,000, the firm said.

"Orders and shipments continued to be impacted by the worldwide recession, and the backlog of $36.2 million was 3% lower than at the beginning of the quarter," Graham Tyson, Dataproducts president, said.

"Our business, however, is showing signs of improvement, mainly as a result of an expanding customer base."

All phases of business remain profitable, he added.

Figures for 1974 have been restated to treat Data Card as an unconsolidated subsidiary.

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Earnings Reports

XEROX
Three Months Ended June 30

	1975 (000)	a1974 (000)
Shr Ernd	$.05	$1.10
Revenue	1,024,947	864,628
Disc Op	b(91,925)	(3,200)
Earnings	4,150	87,500
6 Mo Shr	1.09	2.09
Revenue	1,972,512	1,651,449
Disc Op	b(97,325)	(8,772)
Earnings	86,663	165,756

a-Restated. b-Includes an estimated net loss of $84.4 million on disposition of discontinued operations.

BRADFORD COMPUTER AND SYSTEMS
Three Months Ended June 30

	1975	a1974
Shr Ernd	$.29	$.26
Revenue	17,216,000	14,945,000
Tax Cred	10,000	51,000
Earnings	1,160,000	1,041,000
6 Mo Shr	.54	.47
Revenue	34,416,000	29,373,000
Tax Cred	10,000	51,000
Earnings	2,179,000	1,907,000

a-Restated for acquisition of Centurex Corp. on a pooling-of-interests basis and accounting change.

ANACOMP
Quarter Ended March 31

	1975	1974
Shr Ernd	$.32	$.24
Revenue	2,469,708	1,731,241
Tax Cred	115,500	81,700
Earnings	265,976	173,104
9 Mo Shr	.73	.50
Revenue	5,788,033	3,935,117
Tax Cred	250,000	155,000
Earnings	568,306	332,719

INFORMATION INTERNATIONAL
Year Ended April 30

	1975	1974
Shr Ernd	$.59	$.53
Revenue	12,860,159	9,280,058
Spec Cred	.....	291,500
Earnings	1,500,310	1,344,000

COMPUTER HORIZONS
Three Months Ended May 31

	1975	a1974
Shr Ernd	$.01	.....
Revenue	668,240	$635,725
Earnings	3,588	(10,967)

a-Reflects all changes necessary to report discontinuance of the personnel recruitment and placement operations and a change in the method of recording R&D costs.

TRATEC
Year Ended April 30

	1975	1974
Shr Ernd	$.51	$.27
Revenue	2,126,800	1,371,600
Earnings	144,300	98,400

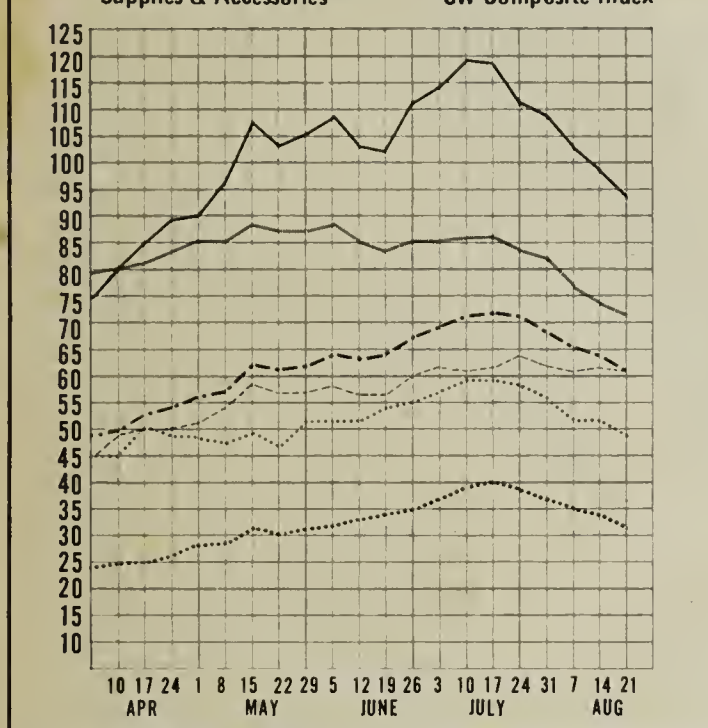
DATA DIMENSIONS
Three Months Ended June 30

	1975	1974
Shr Ernd	$.13	$.14
Revenue	1,155,000	1,151,000
Tax Cred	.....	53,000
Earnings	100,000	114,000
6 Mo Shr	.29	.27
Revenue	2,262,000	2,093,000
Tax Cred	50,000	101,000
Earnings	229,000	215,000

DATA CONTROL SYSTEMS
Three Months Ended June 27

	1975	1974
Shr Ernd	$.05	.....
Revenue	727,000	$817,000
Disc Op	.....	(129,000)
Earnings	43,000	(111,000)
9 Mo Rev	1,873,000	1,832,000
Disc Op	16,000	8,000
Loss	152,000	146,000

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 20, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1975 RANGE (1)	CLOSE AUG 20 1975	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	62-109	87 3/8	-3 7/8	-4.2
O	COMPUTER AUTOMATION	2- 10	7 1/2	- 5/8	-7.6
N	CONTROL DATA CORP	11- 23	15 1/4	-1 1/8	-6.8
N	DATA GENERAL CORP	10- 38	25 5/8	-3 7/8	-13.1
O	DATAPOINT CORP	6- 26	16 1/2	-2 1/2	-13.1
O	DIGITAL COMP CONTROL	1- 4	3 1/4	- 1/2	-13.3
N	DIGITAL EQUIPMENT	46-122	106 1/2	-4 3/4	-4.2
N	ELECTRONIC ASSOC.	2- 3	2 1/4	- 1/2	-18.1
A	ELECTRONIC ENGINEER.	5- 10	8 1/4	- 7/8	-9.5
N	FOXBORO	23- 42	30	-2 3/8	-7.3
O	GENERAL AUTOMATION	6- 14	8 1/8	- 1/2	-5.7
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	58-120	99 1/8	-5 1/8	-4.9
N	HONEYWELL INC	22- 40	26 7/8	-2 1/8	-7.3
N	IBM	158-224	176 1/2	-1	-0.5
O	MEMOREX	1- 10	7 5/8	0	0.0
O	MICRODATA CORP	2- 6	4 1/2	+ 1/4	+5.8
O	MODULAR COMPUTER SYS	5- 19	12	+ 1/2	+4.3
N	NCR	15- 39	25 3/8	-2 7/8	-10.1
O	PRIME COMPUTER INC	2- 6	5	- 1/2	-9.0
N	PERKIN-ELMER	16- 30	22 1/8	-1 7/8	-7.8
N	RAYTHEON CO	26- 59	47 5/8	+1 1/8	+2.4
N	SINGER COMPANY	10- 17	11 3/8	-1 1/8	-9.0
N	SPERRY RAND	26- 49	39 3/4	-1 1/2	-3.6
A	SYSTEMS ENG. LABS	1- 5	3 1/8	+ 1/8	+4.1
O	ULTIMACC SYSTEMS INC	1- 6	5 5/8	+ 1/4	+4.6
N	VARIAN ASSOCIATES	7- 18	12 1/2	- 7/8	-6.5
N	WANG LABS.	7- 17	11 1/2	- 1/4	-2.1
N	XEROX CORP	51- 86	53	-1 5/8	-2.9
	LEASING COMPANIES				
C	COMDISCO INC	1- 5	3 3/8	- 1/8	-3.5
A	COMMERCE GROUP CORP	2- 4	3	+ 1/8	+4.3
A	COMPUTER INVSTRS GRP	1- 2	3/4	- 1/8	-20.0
M	DATRONIC RENTAL	1- 1	1/2	- 1/8	-20.0
A	DCL INC	1- 1	1/2	-	-11.1
N	DPF INC	3- 6	4 5/8	- 1/4	-5.1
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	3 1/4	+ 1/8	+4.0
A	GREYHOUND COMPUTER	2- 3	2 7/8	- 1/8	-4.1
A	ITEL	3- 9	5 3/4	-1	-14.8
N	LEASCO CORP	4- 8	6 1/8	- 1/2	-7.5
O	LEASRAC CORP	1- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 4	2 3/4	- 1/8	-4.3
A	PIONEER TEX CORP	2- 7	5 1/4	0	0.0
A	ROCKWOOD COMPUTER	1- 1	5/8	0	0.0
N	U.S. LEASING	8- 14	8 1/4	-1 7/8	-18.5

EXCH		1975 RANGE (1)	CLOSE AUG 20 1975	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 1	1	0	0.0
A	APPLIED DATA RES.	1- 10	1 3/4	- 1/8	-6.6
N	AUTOMATIC DATA PROC	29- 65	50	-3 1/8	-5.8
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	3- 7	6 1/2	0	0.0
O	COMPUTER DIMENSIONS	2- 6	4 1/4	- 1/4	-5.5
O	COMP ELECTION SYSTMS	3- 6	5 1/4	- 1/4	-4.5
O	COMPUTER HORIZONS	1- 1	7/8	+ 1/8	+16.6
O	COMPUTER NETWORK	1- 3	2 3/8	0	0.0
N	COMPUTER SCIENCES	2- 6	4 1/8	- 3/8	-8.3
O	COMPUTER TASK GROUP	1- 1	5/8	0	0.0
O	COMPUTER USAGE	2- 4	2 1/4	0	0.0
O	COMSHARE	3- 4	2 7/8	- 1/8	-4.1
O	DATATAB	1- 2	1 3/4	+ 1/4	+16.6
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 28	17 3/8	-1	-5.4
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/4	0	0.0
O	KEANE ASSOCIATES	2- 3	2 1/4	0	0.0
O	KEYDATA CORP	2- 3	2 5/8	0	0.0
O	LOGICON	3- 5	3 5/8	0	0.0
A	MANAGEMENT DATA	1- 3	2 1/8	+ 1/8	+6.2
O	NATIONAL CSS INC	6- 14	10 1/4	- 1/4	-2.3
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 17	12 3/4	- 7/8	-6.4
N	PLANNING RESEARCH	2- 6	3 7/8	+ 1/4	+6.8
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	3 1/2	- 1/8	-3.4
O	REYNOLDS & REYNOLD	11- 24	12	0	0.0
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	3/4	0	0.0
O	TYMSHARE INC	7- 21	15	-2 3/8	-13.6
A	URS SYSTEMS	2- 4	3 1/2	+ 3/8	+12.0
N	WYLY CORP	2- 4	3	- 1/4	-7.6
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 9	5 5/8	- 5/8	-10.0
O	ADVANCED MEMORY SYS	1- 7	3 3/8	-1 5/8	-32.5
N	AMPEX CORP	3- 7	4 3/4	- 5/8	-11.6
O	ANDERSON JACOBSON	1- 3	2 3/8	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 5	3 1/8	- 1/2	-13.7
A	BOLT,BERANEK & NEW	5- 13	9 1/8	- 1/2	-5.1
N	BUNKER-RAMO	4- 8	4 5/8	- 3/8	-7.5
A	CALCOMP	4- 7	4 1/4	- 1/2	-10.5
O	CAMBRIDGE MEMORIES	3- 5	3 7/8	0	0.0
N	CENTRONICS DATA COMP	7- 25	16	-1	-5.8
O	CODEX CORP	15- 38	26 1/2	-5 1/4	-16.5
O	COGNITRONICS	1- 2	1 1/8	0	0.0
O	COMPUTER COMMUN.	1- 2	1	- 1/8	-11.1
O	COMPUTER CONSOLES	3- 7	5 1/2	- 1/4	-4.3
A	COMPUTER EQUIPMENT	1- 2	1 1/2	0	0.0
O	COMPUTER MACHINERY	1- 2	1 5/8	+ 1/8	+8.3
O	COMPUTER TRANSCEIVER	1- 2	1 1/8	- 1/8	-10.0
O	COMTEN	2- 5	3 3/4	- 1/8	-3.2
N	CONRAC CORP	12- 23	16 7/8	- 1/8	-0.7

EXCH		1975 RANGE (1)	CLOSE AUG 20 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	1- 3	2	- 1/4	-11.1
O	DATA 100	5- 16	9 1/8	- 1/4	-2.6
A	DATA PRODUCTS CORP	2- 6	3 1/2	- 1/2	-12.5
O	DATA TECHNOLOGY	1- 3	1 3/4	0	0.0
O	DATUM INC	1- 2	1 1/2	- 1/8	-7.6
O	DECISION DATA COMPUT	4- 7	4 1/4	- 1/4	-5.5
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIAN CONTROLS	1- 1	3/4	- 1/2	-40.0
N	ELECTRONIC M & M	1- 3	1 5/8	- 1/2	-23.5
O	FABRI-TEK	1- 1	1	- 1/8	-11.1
O	GENERAL COMPUTER SYS	1- 2	1 1/4	- 1/4	-16.6
N	HAZELTINE CORP	3- 6	4 1/4	+ 1/8	+3.0
N	HARRIS CORP	18- 28	22	-1 3/8	-5.8
A	INCOTERM CORP	3- 12	9 3/8	- 7/8	-8.5
O	INFOREX INC	2- 5	2 7/8	- 1/8	-4.1
O	INFORMATION INTL INC	8- 14	12 1/8	- 1/2	-3.9
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	5/8	0	0.0
A	MILGO ELECTRONICS	8- 24	15 1/2	-1 1/8	-6.7
N	MOHAWK DATA SCI	1- 5	2 1/2	0	0.0
O	OPTICAL SCANNING	1- 3	3	0	0.0
O	PENRIL CORP	2- 2	1 5/8	- 1/8	-7.1
O	PERTEC CORP	2- 8	5 3/4	- 1/4	-4.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	3/4	0	0.0
O	QUANTOR CORP	2- 6	4 1/2	0	0.0
O	RECOGNITION EQUIP	2- 9	6	- 1/4	-4.0
N	SANDERS ASSOCIATES	3- 11	6 1/8	-1	-14.0
O	SCAN DATA	1- 3	1 7/8	- 1/8	-6.2
O	STORAGE TECHNOLOGY	6- 17	11 1/4	- 3/4	-6.2
O	SYCOR INC	5- 15	12 1/4	+ 3/4	+6.5
O	T BAR INC	3- 6	5 1/4	- 1/8	-2.3
O	TALLY CORP.	1- 5	3 1/8	- 1/8	-3.8
O	TEC INC	1- 4	3	- 1/2	-14.2
N	TEKTRONIX INC	18- 41	33 1/4	-2 1/2	-6.9
N	TELEX	1- 3	2 1/4	0	0.0
O	WANGCO INC	4- 9	5 3/4	- 5/8	-9.8
O	WILTEK INC	1- 4	2 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 5	4 1/4	- 1/4	-5.5
A	BARRY WRIGHT	5- 7	6 1/2	- 1/8	-1.8
O	CYBERNATICS INC	1- 1	1/2	0	0.0
A	DATA DOCUMENTS	29- 42	31 7/8	-2	-5.9
O	DUPLEX PRODUCTS INC	12- 25	14 7/8	-2 1/4	-13.1
N	ENNIS BUS. FORMS	5- 7	5 1/4	- 1/8	-2.3
O	GRAHAM MAGNETICS	5- 10	7 1/4	- 1/2	-6.4
O	GRAPHIC CONTROLS	8- 21	10 1/2	+ 1/4	+2.4
N	3M COMPANY	43- 68	51 1/2	-3 1/8	-5.7
O	MOORE CORP LTD	39- 51	42 1/4	-2 1/4	-5.0
N	NASHUA CORP	12- 22	11 5/8	-1 1/4	-9.7
O	STANDARD REGISTER	11- 20	15 1/2	- 1/4	-1.5
O	TAB PRODUCTS CO	4- 8	5 3/4	0	0.0
N	UARCO	17- 24	20	- 1/2	-2.4
O	VANIER GRAPHICS CORP	4- 7	4 3/4	+ 1/4	+5.5
A	WABASH MAGNETICS	3- 5	3 7/8	- 1/8	-3.1
N	WALLACE BUS FORMS	15- 25	18 3/8	- 3/8	-2.0

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